JOURNAL OF COMMUNITY NURSING
JCN
www.jcn.co.uk
Leading, supporting and educating nurses in the community since 1972
Volume 39
Number 1
February/March
2025

The definitive peer-reviewed journal promoting excellence in caring for people at home

TOTAL BARRIER PROTECTION™

The complete cost-effective treatment strategy against MOISTURE-ASSOCIATED SKIN DAMAGE (MASD)

STEP-UP APPROACH

STEP-DOWN APPROACH

CREAM FOR **MILD** SKIN DAMAGE | FILM FOR **MODERATE** SKIN DAMAGE | OINTMENT FOR **SEVERE** SKIN DAMAGE

SKIN DAMAGE METER

MEDI DERMA-S
Total Barrier Cream

MEDI DERMA-S
Total Barrier Film

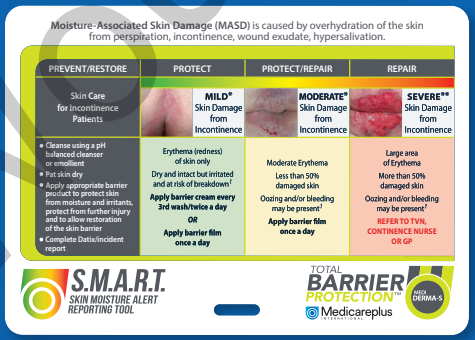
MEDI DERMA-*PRO*
Skin Protectant Ointment and
Foam & Spray Incontinence Cleanser

THE *S.M.A.R.T.* APPROACH TO MOISTURE-ASSOCIATED SKIN DAMAGE

Identify and report MASD appropriately.
In line with NHSI guidelines[2]

RECOGNISED & ENDORSED BY NICE

SCAN FOR YOUR FREE *S.M.A.R.T.* CARD HERE



Visit us at **Wound Care Today, Telford** for our newly developed **Skin Tone Assessment Tool**

AD488TB-JCN170125V1

References: 1. Jones S, Winterbottom C (2019) Skin Moisture Alert Reporting Tool (S.M.A.R.T.). Adapted with kind permission of the National Association of Tissue Viability Nurses Scotland - NATVNS (2014) Scottish Excoriation and Moisture-related Skin Damage Tool. **2.** NHS Improvement (2018) Pressure ulcers: revised definition and measurement summary and recommendation. The ***S.M.A.R.T. Resource*** is the property of Medicareplus International and supports the implementation of recommendations in the NICE guidelines on: Pressure Ulcers: Prevention and Management (CG179), Urinary Incontinence and Pelvic Floor Organ Prolapse in Women: Management (NG123), Faecal Incontinence in Adults: Management (CG39) December 2019.* Images courtesy of Sheffield Teaching Hospitals NHS Trust. ** Image courtesy of NATVNS.

Medicareplus INTERNATIONAL

Medicareplus International Limited
Chemilines House | Alperton Lane | London | HA0 1DX | UK
Telephone: +44 (0)20 8810 8811 | Email: info@medicareplus.co.uk
www.medicareplus.co.uk

Follow us on:
@medicareplusuk

Contents

Journal of Community Nursing
incorporating *Journal of District Nursing*
February/March 2025

Unit G, Wixford Park, George's Elm Lane, Bidford on Avon, Alcester B50 4JS

ISSN 0263 4465

t: +44(0) 1789 582000
e: mail@jcn.co.uk
http://www.jcn.co.uk

Journal of Community Nursing is indexed with CINAHL and British Nursing Index (BNI)

Published bi-monthly and available free online for community and district practitioners based at primary and secondary care locations throughout the United Kingdom. Also distributed with subscription.

Institutional and overseas subscription rates:
United Kingdom: £175.00
Overseas: £295.00

UK subscription rate:
Six issues per year: £30

If you would like to comment on any of the articles in JCN, or indeed have ideas of your own for an article, please contact: binkie@jcn.co.uk

Current state and future directions of the NHS

Welcome to 2025 and another exciting year for the Journal of *Community Nursing*. Over the coming year, as we do each year, we will keep you up to date with the latest information and current themes. We aim to support your education and development with our many learning resources, including journal articles, interactive education, product features and our JCN events. Remember — we are here for you, so please utilise all our online resources.

In this issue, the focus of the 'Community matters' piece is the latest Darzi report. This feature is definitely one to read! It discusses the findings of the report, which include the failings of the NHS and the decline in determinates of health. We are all aware of the effects and pressures on our community that the lack of funding in community services has caused and this report supports our views. Similarly, we all know that staff working within the NHS are dedicated and committed and are the 'backbone' of the NHS — this is also detailed in the report. Please take some time to read both the article and the actual report and consider the views of a variety of experts.

While wound care is such a vital part of community nursing, it can be hard keeping pace with new products and devices. Malodorous wounds can be especially challenging both for patients and healthcare professionals — not only because of the physical impact, but also the psychological and social implications, requiring nurses to strike a balance between effective wound management and compassionate patient care. Susy Pramod takes a look at this complex issue, offering valuable guidance on assessing and managing malodorous wounds (*pp. 18–25*). Cavity wounds can also be complex, often significantly affecting patient quality of life. Selecting the right dressing to maintain an optimal wound environment, while ensuring patient-centred care, is crucial for managing the challenges of such wounds, as the article here explores (*pp. 44–49*). The impact of leg ulcers on healthcare services and patients is another key area that this issue looks at, discussing the potential of muscle pump activation (MPA) as an adjuctive therapy to improve healing rates and reduce costs (*pp. 30–36*). We hope that this focus on wound care will support you in your daily practice in the community and provide useful additions to your wound care armamentarium.

As always, the JCN study days are rolling out around the country this year, so don't forget to check when we are in your area, as they are a great way to hear experts speak, meet exhibitors and discuss latest products and treatments and, of course, to network and catch up with colleagues — www.jcn.co.uk/events.

Annette Bades, editor-in-chief, *JCN*

JOURNAL OF COMMUNITY NURSING
JCN

People.Health.Care.

NEW - Now available on NHS Supply chain and off-script ordering systems

Debrisoft® Duo

Discover the new side of debridement.

2-in-1 flexible debridement pad:

- The **original soft monofilament fibre white side** removes debris, slough, exudate and biofilm from the wound.[1]
- The **new textured beige** side makes it easy to loosen firmly adherent, fibrinous devitalised tissue such as slough, skin flakes and keratoses.[2]

Two sides, one solution.

Upgrade to **Debrisoft® Duo** today, **contact us here…**

1-2: vitro data on file C.Panhölzl in R

L&R Medical UK Ltd, 1 Wellington Court, Lancaster Park, Needwood, Burton Upon Trent, Staffordshire DE13 9PS

ADV372 V1.1

www.Lohmann-Rauscher.com

Editorial board

I am a clinical research advisor, district nurse and Queen's Nurse. I am passionate about community care and developing evidence-based care to provide better outcomes for patients and amplifying the patient voice via qualitative research. I am pleased to be part of the JCN editorial board as the journal provides an accessible platform for community nurses to learn, discuss and share clinical practice.
Hannah Brady Sawant

I am a senior lecturer with a background in district nursing, continuing healthcare (CHC) funding, palliative care and diabetes.
I feel privileged to be able to influence the future district nursing workforce and love my job! I am passionate about innovation and encouraging district nurse students to reach their full potential. The JCN has been an integral part of my nursing career, with attendance at many JCN events and study days and the contemporary learning gained from reading each issue. The JCN published my first article and gave me the confidence to write more. A thirst for knowledge is fundamental in primary care, and this excellent free resource cannot be overstated. I am honoured to be part of the JCN editorial board.
Teresa Davies

I am a community nurse with a background in urgent community response. I am currently working as a senior lecturer and am passionate about raising the profile of community nursing (in all its forms) within pre-registration healthcare education. I am proud to be a Queen's Nurse and a non-medical prescriber and have a special interest in prevention of hospital admission, advanced physical assessment and multidisciplinary working. I am delighted to be joining the JCN editorial board and relish the opportunity to be a part of the ongoing conversation on developments in community nursing.
Abigail Brooks

As an advanced nurse practitioner focusing on chronic disease in Bristol, I am delighted to join the JCN editorial board. Sharing experience and knowledge within the community has become an important process with developments coming in nationally and internationally, and I am keen to be part of making the process easier and more accessible for clinical staff. I hope that my experience of community and primary care, which includes working for a festival charity providing medical cover in a field, a very different setting to that of a clinic, and as an expert witness for civil litigation, can contribute to JCN.
Wendy Smith

JOURNAL OF COMMUNITY NURSING
JCN

solventum

Portrait OF A PATIENT

A new educational platform

Empowering healing through patient stories

- Portrait of a Patient™ provides a new way to learn about compression therapy and uses animation to work through clinical scenarios from initial presentation to healing
- Learn how to have conversations with your patients about the challenges of living with venous leg ulceration and the benefits of compression therapy
- Understand the benefits of 3M™ Coban™ 2 Layer Compression System for the treatment of people with venous leg ulcers and learn how to apply it

PORTRAITOFAPATIENT.COM

Sponsored by Solventum

In each issue of the *Journal of Community Nursing*, we investigate a topic affecting our readers. Here, we ask...

What's in the Darzi report and why does it matter?

It's that time again. A new government full of optimism and a freshly minted prime minister bursting with new ideas, the honeymoon period yet to slip into acrimony and divorce.

And we all know what comes next — a new report on the state of the NHS, usually followed by a top-to-bottom reorganisation that will miraculously shorten A&E waiting times, solve the staffing crisis and promise millions of pounds for community services or ailing critical care, whichever happens to be the flavour of the day.

Sound cynical? Maybe, but we've all been here before. As sure as night follows day, each new health secretary will have a well-intentioned stab at solving the NHS' perennial problems by implementing yet another rescue plan, usually involving a complete reversal of the previous government's policies, leaving us back at square one.

Depending on your age (and whether you were paying attention), you will have seen any number of these documents come and go — the *NHS Plan*, the *Five Year Forward View*, *Healthy Lives, Healthy People*. Take your pick.

But, as the dust settles on a new Labour government, the latest attempt to solve the NHS' structural and budgetary issues hits our desks with a resounding thud. The Darzi Review has been billed as 'a rapid investigation of the state of the NHS, assessing patient access, quality of care and the overall performance of the health system' ('Independent Investigation of the National Health Service in England' — assets.publishing.service.gov.uk).

All of which sounds very noble. But, what can community nurses actually expect from the new report, and will it make any difference?

DO YOU WANT THE GOOD OR THE BAD NEWS?

Perhaps the first thing to say about Lord Darzi's report is that it doesn't hold back in delivering a withering assessment of the current state of the NHS.

In his letter to the secretary of state for health and social care outlining the main points of the report, Lord Darzi, an experienced surgeon, goes as far as to say: 'Although I have worked in the NHS for more than 30 years, I have been shocked by what I have found during this investigation — not just in the

The previous Darzi report in 2008 recommended clinics to provide all patients' needs under one roof; unfortunately, the polyclinic never really took off. It's good to have a refresh of his view, but I'm a little jaded with reports, recommendations and inquests, as I'm sure you all are.

Politics determine the future of the NHS with funding and, in particular, the GP contract. While there is an expected rise in GP funding to promote individualised care, and general practice nurses (GPNs) are to be added to the additional roles reimbursement scheme (ARRS), it is yet to be seen if appointment availability and actual care will be improved.

As for those providing care, we must be cared for and cared about; the profession is given the voice it needs as patient advocates. The stress of being unable to provide necessary care is very difficult to manage. Many nurses still haven't received the pay increase due to funding, which also adds to poor morale.

I support free care; however, expectations of the care also need to be balanced with personal responsibility.

Looking to the future as care providers, we need to keep telling our story and remain steadfast patient advocates.

Wendie Smith
Advanced nurse practitioner, Bristol; Queen's Nurse

The state of the nation's health came as a shock to Lord Darzi, but for those nurses working in public health, this will not be a surprise. The lack of investment in public health services, including school nurses, health visitors, and preventative healthcare arguably contributes to the nation having poorer health. 8.2% of government funding went on preventative healthcare in 2022 (www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthcaresystem/bulletins/ukhealthaccounts/2022and2023), alongside a reduction in the training places for specialist community nurses means that the health service is still in medical treatment mode which is more expensive and less environmentally friendly.

There are 350,000 registered community nurses who are key to leading and managing care closer to home. These nurses are essential to promote wellbeing and prevent ill health, but there has been a constant lack of investment in community services and the education of community nurses (https://qni.org.uk/wp-content/uploads/2024/08/District-Nursing-Today-2024.pdf).

40% of health visiting services have been cut since 2015 (https://ihv.org.uk/wp-content/uploads/2023/01/State-of-Health-Visiting-Report-2022-FINAL-VERSION-13.01.23.pdf), which has had a major impact on the 0–5 services which are needed to support the prioritisation of the first 1001 days of life. This lack of investment also affects the health of children between 5–19 years of age who can be supported by a robust school nursing service, but again a depletion of school nurses since 2010 also contributes to poorer health outcomes carried forward as age progresses (https://saphna.co/wp-content/uploads/2021/10/SAPHNA-VISION-FOR-SCHOOL-NURSING.pdf). Darzi's emphasis on the importance of prevention and preventing poorer health outcomes for children is vital for the future health of the nation.

Investment in education and training for the future community workforce who are skilled in health prevention and promotion is vital to support the recommendations made by Lord Darzi and to reduce the inequalities that occur for children and young people, and continue to occur throughout the lifespan.

Amanda Young
Director of Nursing Programmes (innovation and policy), Queen's Nursing Institute (QNI)

health service but in the state of the nation's health' ('Summary letter from Lord Darzi to the Secretary of State for Health and Social Care'— www.gov.uk).

The report goes on to detail the NHS' failings across the past 15 years, including a decline in overall determinants of health, such as poor housing, low incomes and insecure employment. This has been coupled with an inexorable rise in long-term conditions that many of you will be all-too familiar with, for example, diabetes, coronary heart disease and respiratory conditions, alongside a mental health epidemic affecting older people and the young.

As if that wasn't enough, the NHS is still struggling to recover from the Covid-19 pandemic and the report highlights pressing issues in community and population health, with fewer children receiving immunisations and adults not taking up screening opportunities for common cancers, i.e. breast cancer.

WHAT ARE THE EFFECTS IN THE COMMUNITY?

As if we didn't already know, Lord Darzi points to a whole raft of issues affecting community services. One area in which the NHS is failing badly is in the availability of GP appointments, with the report highlighting that practice staff are seeing more patients than ever, but with the number of qualified GPs falling. Also, depending on where you live, there are huge variations in the number of patients trying to see each GP, with staff shortages particularly problematic in deprived areas.

Another factor you will be all-too familiar with is the pressure on waiting times for community services, particularly mental health appointments. While recent governments have made a great deal of noise about reprioritising community care over acute services, Lord Darzi points out that in reality the reverse has happened. Not only are there fewer GPs, but the number of community nurses fell by 5% between 2019 and 2023, with a potentially catastrophic drop in the numbers of health visitors, down by almost 20% in the same period.

No wonder many of you are feeling the strain, and for patients, the report points out that long waits for community services have simply become normalised.

One of the thornier issues that community nurses have to deal with is patient complaints. The report states that patient satisfaction with

The key concern from the Darzi report for district and community nurses is the failure over many years to divert resources into preventative and holistic community care. The emphasis on hospital care, where the NHS budget has grown from 47% in 2006 to 58% in 2022, reflects a system of reactive, hospital-based care over preventive services that could reduce the need for many hospital admissions. There has been a disproportionate increase in hospital expenditure and staffing compared to other areas of healthcare, such as community services, which are better equipped to deliver preventive and holistic care closer to home.

Underinvestment in community services has led to pressure on primary care and a situation where patients are admitted to hospital, not always because of the severity of their conditions, but because there is insufficient support for their needs in the community. The decline in the number of skilled district nurses, who are a vital part of the community care workforce, exacerbates this issue. A 47% decrease in qualified district nurses and community nurses between 2009 and 2024, with a predicted 61% reduction by 2029 (www.rcn.org.uk/news-and-events/Press-Releases/nursing-numbers-plummet-and-waiting-lists-soar-while-government-delays-workforce-plan), is a worrying indicator of the failure to invest in a workforce that provides crucial care at home, improving the patient experience, reducing deterioration, and therefore preventing hospital admissions.

The role of district nurses in providing holistic care that focuses on the whole patient and their carers/family, rather than simply addressing clinical tasks or problems, is critical in reducing hospital admissions. However, as the numbers of district nurses continue to fall and caseloads increase, the ability to provide such care diminishes, often leading to a more task-oriented approach rather than the desired higher standard of care that is comprehensive and personalised to the individual's needs.

The concerns about insufficient investment in community services, including district nurses and community nursing, must be addressed by the health secretary and government. To deliver the high-quality care that the population desires and deserves, there needs to be a fundamental shift in how resources are allocated. Community services should be a higher priority, ensuring that appropriately skilled staff levels are increased and that care is delivered in the community where it can be most effective in preventing hospital admissions and improving outcomes.

The government needs to listen to experts in the field, those working in community care who understand the challenges and have innovative suggestions as to how the needs of patients can be met closer to home. With appropriate investment and support, community healthcare services, especially district nursing, can reduce the burden on hospitals and help to create a more sustainable healthcare system for the future.

Gail Goddard
Floating district nurse manager and senior lecturer; Queen's Nurse

services has declined while the number of complaints has increased, leaving nurses to bear the brunt of the public's annoyance with slow or non-existent services. In turn, this has led to a feeling of disengagement for many staff, with sickness rates cripplingly high, partly as a result of exhaustion and burn-out following the Covid-19 pandemic.

ALL IS NOT LOST

Luckily, the report isn't a complete doom-fest and does offer some solutions, with Lord Darzi singling out primary care for particular attention, stating that 'Community services need to be more visible and have a higher priority given to them'.

The report is also surprisingly positive about the underlying structure of the NHS, pointing out that while it may be in serious trouble, the basic model of care being free at the point of need still works in principle. Also, the report makes the point that despite its problems, one of the strengths of the NHS is the dedication of staff, such as community nurses, who are 'bound by a deep and abiding belief in NHS values' and who have a 'shared passion and determination to make the NHS better for our patients'.

As for solutions, the wide-ranging nature of the report means that concrete suggestions are thin on the ground. But Lord Darzi does offer some hope, with a plan for breathing fresh life into the NHS, some of which will affect community nurses directly:

- Care closer to home — this policy, and the money required to fund it, need to be hardwired into the NHS at every level. This means that general practice, mental health and community services must be expanded to adapt to the needs of the growing number of patients with long-term conditions as the population ages
- Creating a 'neighbourhood' NHS — while this sounds suspiciously like a gimmick, the principle is a good one, involving staff at all levels engaging with 'new multidisciplinary models of care that bring together primary, community and mental health services'
- A fresh impetus for technology — the report states that there has to be significant investment in digital technology to unlock community nurses' productivity. This involves innovations such as digital patient records, apps and smartphone technology, for example to monitor patients remotely, and increased use of 'virtual wards' where equipment, medicines and skills usually provided in hospitals are delivered to patients at home and in care homes.

In 2008, Lord Darzi, a surgeon and health policy expert, published a commissioned strategy document on behalf of NHS England entitled 'High quality care for all', known as the Darzi report. The key themes: quality of care, patient-centred care, clinical leadership, prevention and public health, innovation and technology, equity and access, and workforce development influenced subsequent reforms and policy. In 2018 he produced an interim report, and now in 2024, Lord Darzi has published a further report investigating the current state of the NHS.

The report and summary letter to the secretary of state make for sobering reading, highlighting disengaged staff, cancer mortality rates, waiting times and a general decline in health in the UK population placing increased pressure on all services. He concludes that the NHS is in a critical condition, but there is still hope for recovery.

I would urge you to read the report and consider how, as community staff on the frontline, we can contribute to the improvement needed to deliver the quality service we so desperately want to give to our patients. As employees of the NHS, we have a collective goal, and each small change we make through local service improvement, waste reduction, streamlining or boosting staff morale is contributing to that hope for a sustained and healthy NHS in the future.

Teresa Davies
Senior lecturer in adult nursing, Wrexham University; Queen's Nurse

WHAT THE EXPERTS SAY

The jury is out on whether the report will make any substantive difference to the NHS, and there have been mixed reviews from health service experts and the media.

The Guardian published a range of opinions from NHS staff who flagged-up flaws in the report, highlighting that while it contains some good ideas, what is really needed is less reform and more money ('Lord Darzi's report into the NHS is just the start' — www.theguardian.com).

The King's Fund broadly welcomed Lord Darzi's conclusions while making the point that we didn't need an independent review to tell us that the NHS was in crisis and that radical treatment rather than tinkering with budgets and reorganisation will be required ('The Darzi review of NHS performance signals why radical change is needed' — www.kingsfund.org.uk).

Similarly, the Patients Association argued that the report's stark findings simply mirror what patients across the country have been experiencing, with the chief executive, Rachel Power, stating that the report 'provides a stark and necessary assessment of the challenges facing our NHS… We now must stop normalising the abnormal' ('Patients Association response to the Darzi Review' — www.patients-association.org.uk).

Finally, the Royal College of Nursing (RCN) focused on the need for more investment in nurses if the mooted improvement in community services is going to have any impact: 'A fundamental shift to a community care model cannot simply be wished into existence, especially with thousands fewer specialist community nurses. Only dedicated investment to boost recruitment into nursing can ensure we have enough highly trained staff, where patients need them' ('Royal College of Nursing responds to publication of Lord Darzi's independent investigation of the NHS in England' — www.rcn.org.uk).

Overall, Lord Darzi's report provides a surprisingly honest analysis of the state of the NHS. We can only hope that the current health secretary, unlike many of his predecessors, doesn't simply file it away in the drawer marked 'job done' and assume that sprinkling a few million here and there will be enough to solve the health service's deep-rooted issues. The report

The Darzi report has received a mixed reception following its publication and although the majority of the findings are not new, it could be argued that the depth of the issues are still startling, nonetheless.

Numerous studies and anecdotal evidence point to a deteriorating service being offered to individuals receiving care — despite the often near heroic efforts of individuals who are working at a phenomenal level to deliver care within a world of beleaguered resources.

Combating these established issues requires a fundamental change and shift. Whether there is a real appetite for this politically, and the financial resources available, will be the challenge — but certainly from society and services users' point of view, change is wanted.

The Darzi report has made some useful suggestions. However, deep-rooted issues also need to be addressed. Nurse recruitment should be seriously amended. It is vital to ensure that all student nurses pay no fees to study their nursing degree, whether undertaking BSc or MSc. All student nurses should receive an improved bursary, with practice hours substantially reduced while in training. These steps will help to improve recruitment and enhance retainment of student nurses and ultimately lead to an enlarged, professional and educated workforce.

Once qualified, pay and conditions in service need to be dramatically addressed and significantly improved to ensure retention of all staff, both in the secondary and primary care arenas. Ongoing support such as access to training and increased access to flexible working need to be available. Such actions will fundamentally improve the service and standard of care that patients and service users receive, which is what they are currently asking for and certainly deserve.

Facing the issues front and centre requires political will and resolve and wholesale change while ensuring that person-centred, integrated care remains the central tenant for these changes. Society and services users certainly want these improvements immediately and for the NHS to be both fit for purpose now and for the future.

Bravery and listening to those involved, both service users and clinicians, including the information and recommendations provided by Lord Darzi's report is vital. It is imperative we all work together to help bring about these changes.

Teresa Burdett
Principal academic, Bournemouth University

represents a challenge to the new government, and only time will tell if ministers are prepared to give community nurses the money, extra staff and digital innovations they need to bring an ailing NHS back to life. JCN

REFERENCES

Guardian (2024) Letters. *Lord Darzi's report into the NHS is just the start.* Available online: www.theguardian.com/society/2024/sep/16/lord-darzis-report-into-the-nhs-is-just-the-start

Independent Investigation of the National Health Service in England. Available online: https://assets.publishing.service.gov.uk/media/66f42ae630536cb92748271f/Lord-Darzi-Independent-Investigation-of-the-National-Health-Service-in-England-Updated-25-September.pdf

King's Fund (2024) *The Darzi review of NHS performance signals why radical change is needed*. Available online: www.kingsfund.org.uk/insight-and-analysis/blogs/darzi-review-nhs-performance-radical-change

Patients Association (2024) *Patients Association response to the Darzi Review*. Available online: www.patients-association.org.uk/news/patients-association-response-to-the-darzi-review#:~:text=We%20stand%20ready%20to%20work,bold%2C%20patient%2Dcentred%20change.

Royal College of Nursing (2024) *Royal College of Nursing responds to publication of Lord Darzi's Independent investigation of the NHS in England*. Available online: www.rcn.org.uk/news-and-events/Press-Releases/rcn-responds-to-publication-of-lord-darzi-independent-investigation-of-the-nhs-in-england

Summary letter from Lord Darzi to the Secretary of State for Health and Social Care. Available online: www.gov.uk/government/publications/independent-investigation-of-the-nhs-in-england/summary-letter-from-lord-darzi-to-the-secretary-of-state-for-health-and-social-care

People.Health.Care.

NOW AVAILABLE ON PRESCRIPTION

Suprasorb® Liquacel Pro NEW

Only the wound bed should shrink - Transform your Gelling Fibre family

www.Lohmann-Rauscher.com

Keeping lipoedema in the spotlight

Sharie Fetzer, chair, Lipoedema UK

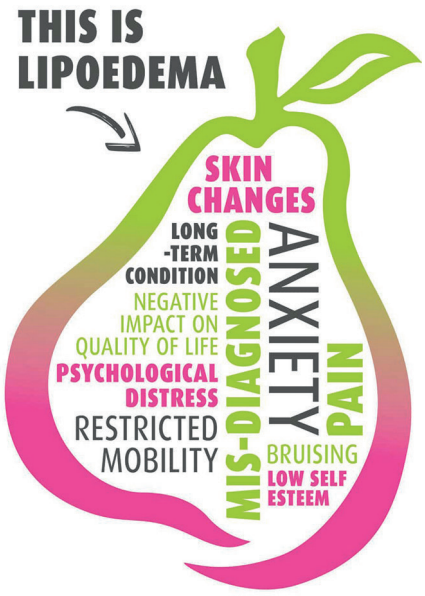
'Central to Lipoedema UK's mission is that healthcare professionals understand the importance of early diagnosis.'

Few sectors look set to benefit so completely from incoming technological advances than the healthcare sector. Developments and innovations in dermatology are the subject of a new programme, *The Future of Dermatology: Spotlight on Skin*, produced by ITN Business and the British Skin Foundation, which premiered in January this year. Among the different conditions highlighted is lipoedema, a condition that affects millions of women worldwide.

Lipoedema is a chronic, connective adipose tissue disorder that almost exclusively affects women. It is characterised by a symmetrical, disproportionate distribution and build-up of abnormal fat, which mainly affects the hips, buttocks and legs. The symptoms of lipoedema include heaviness, discomfort and pain in the affected areas, which might be hypersensitive to touch or pressure, and easily bruised. While it relates to adipose tissue, lipoedema does have implications for the skin, which may be uneven, with a dimpled or mattress appearance and/or nodular texture and often appears pale and feels cold to the touch on affected areas (Primary Care Dermatology Society, 2021; Lipoedema UK, 2024; NHS, 2024).

Leading the efforts to raise awareness of lipoedema is Lipoedema UK, whose goals are to spotlight the difficulties associated with obtaining a diagnosis and treatment. Thus, the charity is pleased to feature in the new ITN Business and British Skin Foundation series exploring stories that showcase research and innovations which are improving the lives of people living with skin conditions.

Skin conditions affect around 60% of people in the UK at some point in their lifetime (British Skin Foundation, 2024). Some of these are common complaints, such as acne and eczema; while others, such as alopecia, are more rare. Although lipoedema is not uncommon, due to lack of awareness and training it is often misdiagnosed as obesity or lymphoedema (Fetzer and Fetzer, 2016) (see *pp. 56–63* in this issue, which summarise the key findings that emerged from surveys recently undertaken with both lipoedema patients and healthcare professionals).



Word Pear © Lipoedema UK.

Research indicates that lipoedema is a genetic condition (Grigoriadis et al, 2022), but it is currently diagnosed only by its symptoms and, to date, there is no cure. Treatments include compression therapy, as well as non-cosmetic liposuction, which is currently not available to patients on the NHS. Left untreated, lipoedema symptoms can impair mobility and normal day-to-day activities and wellbeing. In the later stages, lipoedema patients may have associated joint problems and/or secondary lymphoedema (Wounds UK, 2017).

Sharie Fetzer, chair of Lipoedema UK, said:

> *We are delighted to be involved in a project that is produced in partnership with the British Skin Foundation. Lipoedema affects patients in many different ways, some of which are not visible — patients frequently report that lipoedema has damaged their self-confidence, affected their mobility and undermined their capacity to enjoy sport, as well as causing pain — but it also has implications for the skin. Skincare is an important part of lipoedema management. We are passionate about spreading awareness and helping patients to help themselves with good skincare, nutrition and exercise, and well-fitting compression, and to seek surgical and weight management solutions when appropriate.*

In *The Future of Dermatology: Spotlight on Skin*, presenter Sharon Thomas interviews Dr Guido Köhler, a consultant plastic surgeon, and patient, Sandra Slaughter, about lipoedema. Sandra describes how her symptoms appeared at the age of eight or nine and the impact her late diagnosis has had on her self-esteem

and confidence. Dr Köhler explains the benefits of early diagnosis and treatment for patients. Sandra details the way that lipoedema impacted her own life and that of her two teenage daughters and the ways that non-cosmetic liposuction has changed all their lives for the better.

For Sandra, participating in this production to raise awareness of lipoedema was important. She said:

I felt proud to have been invited to be a part of this project. I spent 42 years of my life on restriction diets, having been told by numerous medical professionals the disproportionate and unsightly presentation of my legs was fat. It was a shock when I finally discovered I had lipoedema. My daughters were diagnosed at the same time as me — I was 50 and they were 20 and 17 years old respectively. It was also clear my 82-year-old mother had lipoedema, as had each of her seven sisters and my Nan.

Although lipoedema was first described in the 1940s, it has remained relatively little known even within the international medical community. Lipoedema UK is a member of the Lipedema World Alliance (LWA), an international collaboration promoting research and projects to discover the causes and best treatments for lipoedema.

Central to Lipoedema UK's mission is that healthcare professionals understand the importance of early diagnosis. To this end, the charity has produced guidelines for diagnosis and worked with the Royal College of General Practitioners (RCGP) to produce an eLearning course on lipoedema aimed at GPs and primary healthcare professionals, although it is available to everyone for a small fee, online via the charity's website: www.lipoedema.co.uk.

Sharie Fetzer said:

As Dr Köhler says in the programme, early diagnosis is key for patients to manage their symptoms and protect younger patients from years, or even decades, of misdiagnosis and self-blame, especially as lipoedema is commonly misdiagnosed as obesity. It's essential that healthcare providers are informed that lipoedema is not caused by being overweight — you can be a healthy weight and still have lipoedema.

From left, Dr Guido Köhler, a consultant plastic surgeon, and patient, Sandra Slaughter, being interviewed by presenter, Sharon Thomas.

Obtaining a diagnosis has made an immeasurable difference to Sandra, who commented:

Lipoedema has influenced every aspect of my life. Believing I was a greedy overeater who was responsible for creating abnormal fat legs led to an unhealthy diet mentality. Cruel comments reduced my self-esteem and confidence and impacted my participation in social and recreational activities. I had to redirect my career path due to pain and discomfort and these factors, as well as reduced mobility, sadly affected my experience as a mother too. My daughters' diagnosis at young ages of course wasn't ideal, but it immediately took away the self-blame that their heavy legs were their fault. This has helped to support their mental and emotional health, and the opportunity for us all to have non-cosmetic liposuction has improved our physical health immensely.

At 58 years of age, I now feel blessed to live in a light, pain-free body. I have full mobility and I am able to participate in sport and choose the clothes I like to wear. This has been life changing for me and something those suffering with lipoedema have both the right to experience and deserve. JCN

REFERENCES

British Skin Foundation (2024) *Know your skin*. Available online: https://knowyourskin.britishskinfoundation.org.uk/about/

Fetzer A, Fetzer S (2016) *Lipoedema UK survey 2014 research report*. Available online: https://lipoedema.co.uk/wp-content/uploads/2024/05/LATEST-LUK000-UK-Big-Survey16-Mar24-web.pdf

Grigoriadis D, Sackey E, Riches K, et al (2022) Investigation of clinical characteristics and genome associations in the 'UK Lipoedema' cohort. *Plos One* 17(10): e0274867

Lipoedema UK (2024) *What is lipoedema?* Available online: https://lipoedema.co.uk/about-lipoedema/

NHS (2024) *Lipoedema*. Available online: www.nhs.uk/conditions/lipoedema/

Primary Care Dermatology Society (2021) *Lipoedema*. Available online: www.pcds.org.uk/clinical-guidance/lipoedema

Wounds UK (2017) *Best Practice Guidelines: The Management of Lipoedema*. Wounds UK, London. Available online: www.wounds-uk.com

More information...

The Future of Dermatology: Spotlight on Skin is available to watch at www.lipoedema.co.uk and https://business.itn.co.uk

Working for people living with pain

Beki Osborne, trustee, Pain UK CIO

Currently, there are more than eight million people in the UK living with moderate to severely disabling pain and approximately 43% of adults, equating to almost 28 million people, experiencing some form of chronic pain. It was recently reported by the Health Foundation thinktank that the 'number of people with chronic pain in England [is set] to rise by 1.9m by 2040' (Health Foundation, 2023).

Women in particular suffer from chronic pain, with research consistently showing higher rates of chronic pain in women in comparison to men (Equal Lives, 2023). Less is known about the causes of chronic pain conditions in women, and fewer medical advancements have been achieved in the treatment of women's pain (with Equal Lives reporting that 80% of pain medication only ever being tested on men).

Pain is a contributing factor for people seeking emergency medical attention. Indeed, 66% of people attending A&E seeking help with their pain had made three visits to another healthcare professional in the preceding weeks (British Pain Society, 2012). Chronic and severe pain and a lack of effective treatment or management options can also have devastating impacts on a person's mental health, with one study finding that 60% of people with chronic pain had severe depression (Rayner et al, 2016).

The social and economic effect on a person who suffers with chronic pain cannot be understated. Twenty-five percent of people (3.5 million) living with chronic pain said that their pain has kept them from their usual activities, including work, on at least 14 days in the last four months. Due to this, these individuals and their families can be pushed into poverty, with 42% in the lowest income households being more likely to report chronic pain (Bridges, 2011).

Pain UK CIO is a charitable organisation providing a voice for people living with pain in the UK. This is done by bringing together over 45 UK voluntary organisations who support those with medical conditions that present with symptoms of pain, in a common effort to increase awareness of the lived experience of pain. In doing so, Pain UK aims to improve education, care, treatment and the management of pain.

Pain UK has provided this support since 2011 and is entirely volunteer led. The Board of Trustees and volunteers all have lived experience of, or connections to those who experience living with chronic pain. The charity strives to promote social inclusion and acknowledge the toll that pain can have on a person physically and mentally, as well as the impact on their family, those who support them, and for wider society.

As well as supporting member charities, individual membership and a signposting service that aims to connect individuals with the specialist support they need are offered. The demand for the service has increased by over 69% in the past year, due to the strain on public services causing people to turn to Pain UK for direction and specialist support from charity members.

In 2022, Pain UK began a research project, the UK Lived Experience of Pain Project (UKLEPP), which provided a validated summary of the lived experiences of people with chronic and long-term pain. It highlighted the adverse nature, complications and consequences of living with chronic pain in the UK, and the multiple shortcomings in the ways in which pain is addressed by others in the UK (van Rysewyk et al, 2023).

We are currently fundraising to support our work, as well as commissioning further work to analyse the results of the first phase of UKLEPP and conduct some qualitative research to provide the government with a richer understanding of the impacts of living with chronic pain in the UK, and the cost and burden to the NHS due to a lack of understanding and treatment options.

REFERENCES

Bridges S (2011) *Chronic pain*. Available online: https://files.digital.nhs.uk/publicationimport/pub09xxx/pub09300/hse2011-ch9-chronic-pain.pdf

British Pain Society (2012) *National pain audit final report*. Available online: www.britishpainsociety.org/static/uploads/resources/files/members_articles_npa_2012_1.pdf

Equal Lives (2023) *The inequalities of chronic pain*. Available online: www.equallives.org.uk/post/the-inequalities-of-chronic-pain

Health Foundation (2023) *Health in 2040: projected patterns of illness in England*. Available online: www.health.org.uk/reports-and-analysis/reports/health-in-2040-projected-patterns-of-illness-in-england

Rayner L, Hotopf M, Petkova H, et al (2016) Depression in patients with chronic pain attending a specialised pain treatment centre: prevalence and impact on health care costs. *Pain* 157(7): 1472–79

van Rysewyk S, Blomkvist R, Chuter A, et al (2023) Understanding the lived experience of chronic pain: a systematic review and synthesis of qualitative evidence syntheses. *Br J Pain* 17(6): 592–605

More information...

To find out more about Pain UK and how to support us, visit: https://painuk.org/

In this together

In This Together is a free magazine and website for anyone who wants to learn more about their condition and how to **improve their health and wellbeing.**

- **In This Together Wounds**
  - DIABETES-RELATED FOOT ULCERS EDITION
  - VENOUS LEG ULCERS EDITION
- **In This Together Compression**

In This Together FREE magazine and website includes:

- Educational articles on all aspects of living with a long-term condition based on best practice
- Health and wellbeing advice from leading experts
- Patient charities and support information
- Common questions and problems answered
- Product and prescription information

SIGN UP TODAY and join our community

www.inthis-together.co.uk

Advice. Guidance. Support. Community

Impact of wound malodour on patients: how to assess and manage

Susy Pramod

Wound malodour is a distressing symptom that significantly impacts the quality of life of patients and their caregivers, often leading to anxiety, stress, and social isolation. This review explores the multifaceted aspects of malodour management, highlighting its causes, assessment challenges, and potential interventions. A holistic, patient-centred approach is critical, ensuring regular reassessment of the wound and addressing concerns such as pain, poor sleep, anxiety, and depression. By incorporating evidence-based strategies and open communication, healthcare professionals can improve the overall wellbeing of patients and their caregivers.

KEYWORDS:
- Carbon superabsorbent dressing
- Patient quality of life
- Wound malodour
- Wound infection
- Management of malodour
- Malignant fungating wounds

Chronic wounds pose a significant burden on the NHS, clinicians, and patients, with their prevalence expected to rise in coming years due to an ageing population and the increasing complexity of comorbid conditions (Guest et al, 2020; Gethin, 2023a). These wounds are often in a cycle of unresolved inflammation and poor healing driven by factors such as ageing, comorbidities, medication, poor blood supply, unresolved infection and malignancy (Zhao et al, 2016; Edwards-Jones, 2018). The most reported symptoms that often accompany chronic wounds include pain, high exudate volume and malodour, which can profoundly impact on patient quality of life (Gethin, 2023a; Probst and Saini, 2024). Nurses who regularly manage wounds may have encountered situations in either a clinic room or a patient's home when the malodour coming from the wound is almost so overpowering that it lingers in the clinic room, or the smell lingers throughout the day. For those who have experienced this, it may be difficult not to show some reaction due to the odour, or to broach the subject with the patient for fear of causing embarrassment or distress. For patients, however, wound malodour can cause significant emotional distress and lead to embarrassment and diminished quality of life (Gethin et al, 2023a). This may result in reduced participation in activities and, in some cases, social isolation (Akhmetova et al, 2016; Gethin et al, 2023a). Furthermore, malodour from a wound may permeate clothing, bedsheets or even soft furnishings, compounding the patient's discomfort and anxiety (Black and Berke, 2020).

'The most reported symptoms that often accompany chronic wounds include pain, high exudate volume and malodour, which can profoundly impact on patient quality of life.'

Despite its significant impact, there is limited guidance in the literature on managing wound malodour — assessment frequently remains subjective and management is often suboptimal (Gethin et al, 2014; Gethin et al, 2023a). This article aims to enhance understanding of wound malodour, focusing on its causes, assessment methods, and available treatment options to better address this challenge in clinical practice.

WOUNDS COMMONLY ASSOCIATED WITH MALODOUR

Any wound has the potential to be malodorous, especially if infection is present (Gethin et al, 2014). However, the most common wounds associated with malodour are those linked to chronicity and high exudate volume, such as leg ulcers, diabetic foot ulcers, burns and malignant/fungating wounds (MFWs) (Gethin et al, 2023b).

CAUSES OF MALODOUR

Odour is most commonly associated with infection (International Wound Infection Institute [IWII], 2022). The chronic wound environment creates an ideal medium for bacterial growth, which contributes to sustained inflammation and perpetuates the chronicity of the wound (Zielinska et al, 2023). Most chronic and malignant wounds are polymicrobial and may contain a mixture of aerobic and anaerobic bacteria, which further increases the risk of hard-to-treat biofilm formation and contributes to the cycle of unresolved infection (Gethin

Susy Pramod, tissue viability matron, The Christie NHS Foundation Trust

et al, 2023b). It has been suggested that up to 80% of chronic wounds and 25% of malignant wounds have the presence of a biofilm (Malone et al, 2017; Edwards-Jones, 2018). Biofilm and wound infection increase the risk of unpleasant symptoms such as excessive exudate, pain, and malodour (Edwards-Jones, 2018). In the presence of infection or biofilm, odour arises during metabolic processes in which bacteria break down substrates like lipids, proteins, and carbohydrates through the action of various enzymes, producing volatile chemical compounds such as cadaverine, putrescine and sulfur containing compounds as a byproduct which are responsible for the odour (Fleck, 2006; Edwards-Jones, 2018). *Table 1* gives examples of common types of bacteria associated with wound odour.

Malodour is not always indicative of a problem within the wound and may naturally occur during the wound healing process (Fletcher, 2008). For instance, pungent odours such as cadaverine and putrescine are produced during the breakdown of amino acids in dead tissue, such as necrotic tissue, and are often described as rotting meat (Gethin et al 2014) and typically subside once the devitalised tissue is removed. Certain dressings, such as hydrocolloids, may also produce an unusual odour, which is not necessarily a cause for concern (Fletcher, 2008). Additionally, inadequate wound hygiene or poor personal hygiene may result in strong odours emanating from the wound or the surrounding skin. Even a generalised wound odour, which is not necessarily linked to a more serious issue, can be as distressing to patients as more pungent smelling wounds.

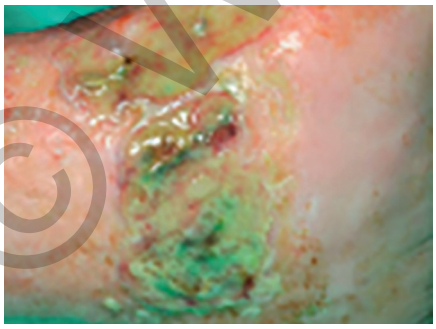


Figure 1.
Wound infected with Pseudomonas aeruginosa.

IMPACT OF MALODOUR ON A PATIENT

The impact that an individual and their carers experience when they have a malodorous wound should not be underestimated. Moreover, patients often resign themselves to living with wound odour, accepting it as an inevitable consequence of having a wound (Gethin et al, 2023a). Odorous compounds, such as putrescine and cadaverine, are known to facilitate gagging and vomiting in some individuals and persistent odour from other bacteria may cause nausea and lack of appetite — often experienced in patients with MFWs (Fleck, 2006). *Table 2* highlights some of the key challenges faced by patients experiencing malodour. This list is not exhaustive, as each individual may perceive and be affected by malodour in unique ways in their daily life.

Many patients and carers often become resilient and develop their own strategies to manage or mask the odour, such as frequent dressing changes, regular change of clothes and bed sheets, using fragrance sprays, candles and incense sticks (Fleck, 2006; Gethin et al, 2023a).

Table 1: Examples of odour producing bacteria (adapted from Edwards Jones, 2018; Akhmetova et al, 2016)

Aerobic bacteria
Proteus sp
Klebsiella sp
Pseudomonas aeruginosa (*Figure 1*)
Staphylococcus aureus
Methicillin resistant staphylococcus (MRSA)
Anaerobic bacteria
Bacteroides
Clostridium sp

ASSESSMENT OF MALODOUR

Comprehensive patient assessment is crucial for any wound to:

- Determine its aetiology
- Identify potential barriers to healing
- Understand the factors contributing to malodour
- Guide decision-making for appropriate treatment

(Marshall, 2022).

Assessment of malodour is an integral part of holistic assessment; however, it can be challenging and often subjective (Fletcher, 2008). These challenges can arise because

Table 2: Effect of malodour on an individual (adapted from Fleck, 2006; Salmala and Davis, 2015; Gethin et al, 2023a)

Psychological
Embarrassment/shame/depression
Negative body image/low self-esteem
Anxiety
Negative impact on sexual relationships
Physical
Taste and smell are closely associated and can result in reduced appetite or nausea
Sleep disturbances
Social
Isolation — social withdrawal and reduced interactions with loved ones
Financial implications — may affect ability to work
Impact on care
Patient resistance to treatment due to feelings of embarrassment; can impact long-term wound healing
Lack of confidence in clinicians — perception of poor care due to persistent odour
Impact on family/carers
Reduced interaction
Stressful to manage
Disengagement/lack of involvement in patient care because of odour
Perceived lack of hygiene
Distressing for caregivers

the perception of malodour varies between clinicians and patients (Gethin et al, 2023b). Additionally, some individuals, including healthcare professionals (HCPs) and patients, may experience a loss of taste and smell — anosmia — that never fully returned after Covid-19.

Certain medical conditions and medications can also contribute to anosmia (Li and Lui, 2023). Patients themselves may become desensitised to the smell over time, although this is not necessarily the case for their relatives or the HCPs providing care (Fleck, 2006).

Table 3: Odour measurement scales (adapted from Browne et al, 2004; Fletcher, 2008; World Union of Wound Healing Societies [WUWHS], 2019)

Type of odour measurement	Components of assessment
Visual analogue scale 1–10	▸ 1=no odour; 10=very strong odour
Teler® odour scale — focus on strength of odour	▸ Code 5: no odour ▸ Code 4: odour is detected on removal of dressing ▸ Code 3: odour evident on exposure of dressing ▸ Code 2: odour evident at arm's length from patient ▸ Code 1: odour evident on entering room ▸ Code 0: odour evident on entering ward/house/clinic
Teler® impact of odour — considers how odour impacts an individual, this score uses components relating to how many are experienced by the patient	Components: ▸ a: aware of odour ▸ b: concerned that other people will notice it ▸ c: reluctance to socialise ▸ d: affects appetite ▸ e: nauseated by odour Code for how many components are experienced: ▸ Code 5: no components experienced ▸ Code 4: one component experienced ▸ Code 3: two components experienced ▸ Code 2: three components experienced ▸ Code 1: four components experienced ▸ Code 0: five components experienced
Baker and Haig, 1981	▸ Strong: odour is evident when patient enters the room or 6–10 feet away with dressing intact ▸ Moderate: odour is present when patient enters the room with dressing removed ▸ Slight: odour is present at proximity when dressing is removed ▸ No odour: no odour is present

Table 4: Treatment of infection following the wound infection continuum (adapted from IWII, 2022)

Position on wound continuum	Signs and symptoms	Treatment options
Local infection	Overgranulation, bleeding friable tissue, increased exudate, delayed healing, wound breakdown, erythema, warmth, swelling, increased pain and malodour	Cleansing and debridement. Consider treatment with topical antimicrobial, e.g. silver, iodine, PHMB, honey
Spreading infection	All of the above plus: spreading erythema into surrounding tissues >2cm, crepitus, wound breakdown and swelling of the lymph glands	Cleansing and debridement. Commence systemic antibiotics and consider adjunctive treatment with topical antimicrobial agent. Swab wound using Levine technique to correctly identify organism present and antimicrobial sensitivities
Systemic infection	All of the above plus: malaise, lethargy, loss of appetite, fever/pyrexia, septic shock, organ failure, death	Urgent medical referral needed and start of systemic antibiotics. Topical antimicrobials may be used as adjunctive therapy

Currently, there is no standardised assessment tool for odour (Akhmetova et al, 2016), further complicating its evaluation and classification. A survey conducted by Gethin et al (2014) involving 1,444 HCPs found that only 12% assessed odour, primarily using descriptive terms, while just 4.5% of nurses utilised a scale to evaluate odour.

Marshall (2022) suggests that assessment of malodour should be multifactorial and consider:

- How the patient perceives odour and its impact on their psychological wellbeing and activities of daily living
- Odour type using descriptors such as putrid, acrid, pungent and offensive, foul, sweet, strong, smelly. Some bacteria omit particularly identifiable odours, e.g. aerobic bacteria such as *Pseudomonas* has been described as ripe/fruity (grape-like) or fishy, while anaerobic bacteria are often described as more pungent or rotten (Edwards-Jones, 2016; Fleck, 2006)
- Strength of odour.

Existing grading/classification scales for malodour have been developed and used in clinical practice and are summarised in *Table 3* (Fletcher, 2008; Akhmetova et al, 2016). Using an objective approach to odour measurement aids in defining the problem in a more concise manner. However, not all the measurement scales take into consideration the psychological or social impact of malodour. The Visual Analogue Scale and the Haig and Baker Scale are simpler to use compared to the Teler® Scale, which can be completed in two parts: one focusing solely on the strength of the odour and the other assessing its impact on the individual (Browne et al, 2004; Fletcher, 2008).

MANAGEMENT OF MALODOUR

There is little guidance on validated treatment options available to manage wound malodour (Gethin et al, 2023b). This can lead to a trial-and-error approach to management resulting in poorer outcomes

C-Sorb Carbon

Superabsorbent Dressing

Recognising the impact of wound odour

Find out more

Don't mask it, neutralise *it*

info@richardsonhealthcare.com
0800 170 1126
Richardson Healthcare Ltd
Centennial Park, Elstree, WD6 3TJ, UK

richardson healthcare

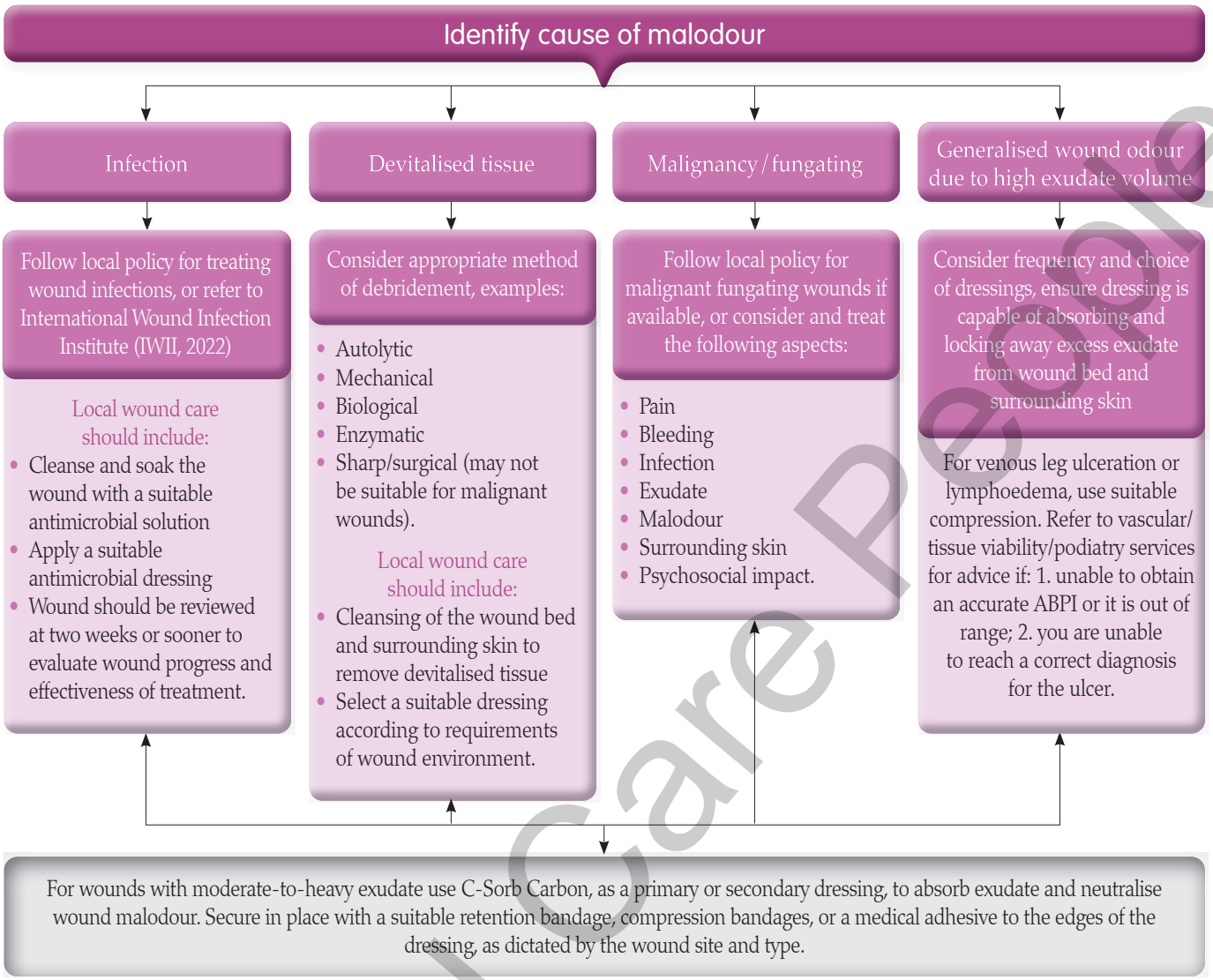


Figure 2.
Wound malodour pathway to treat and neutralise wound malodour (reproduced courtesy of Richardson Healthcare).

for patients (Gethin et al, 2014). Therefore, successful treatment of malodour should focus on identifying and treating the underlying cause (Black and Berke, 2020). Salmala and Davis (2015) proposed a novel approach using the acronym RACE, which gives a structured approach to malodour management.

'Salmala and Davis (2015) proposed a novel approach using the acronym RACE, which gives a structured approach to malodour management.'

R = removal of necrotic tissue and cleansing

Removal of devitalised tissue such as slough and necrosis will not only assist in reducing malodour but also facilitate healing and reduce risk of infection (IWII, 2022). The method of debridement will depend on the clinical environment, characteristics of the wound and clinical skills of the HCP. Debridement options commonly used in practice are autolytic, mechanical, biological (larval therapy), sharp debridement and surgical debridement. For MFWs, sharp and surgical debridement may not be suitable due to the risk of excessive bleeding of the friable tissue and a more conservative approach may be more appropriate (Black and Berke, 2020).

The wound and periwound skin should be cleansed with an appropriate cleansing agent at each dressing change, in accordance with local policy, to remove loose debris from the wound and surrounding skin. This process also helps to disrupt any biofilm that may be present (Black and Berke, 2020; Murphy et al, 2020). Cleansing agents containing both a surfactant and antimicrobial agent can also be considered to reduce bioburden such as polyhexamethylene biguanide (PHMB) and octenidine dihydrochloride (OCT) (Black and Berke, 2020).

A = antibacterial agent and absorbent dressing

Antibacterial agent

Infection is the most common cause of wound odour (Akhmetova et al, 2016). Thorough patient assessment and clinical examination should guide the clinician in selecting appropriate treatment, which may include a topical antimicrobial or systemic antibiotics. Treatment decisions should align with local policy and

consider the wound's position on the wound infection continuum (IWII, 2022; *Table 4*).

Use of topical antibiotics should not be encouraged due to antimicrobial resistance, apart from cases of MFWs where anaerobic bacteria are believed to cause distressing odour. The use of 0.75% topical metronidazole gel has been shown to reduce odour and enhance quality of life for palliative patients (Watanabe, 2016).

Absorbent dressings

When selecting an appropriate dressing to manage malodour, one that can absorb exudate and control odour may offer the advantage of being both cost-effective and efficient (Probst and Saini, 2024).

Carbon and activated charcoal (derived from carbon) have a large active surface which can trap and absorb the volatile organic compounds that produce malodour.

Superabsorbent polymer (SAP)-containing dressings are capable of absorbing and containing a large volume of exudate and have the potential to lock away bacteria into the core of the dressing and, when combined with a carbon layer, are an effective combination for malodour and exudate management (Probst and Saini, 2024).

C = concealers

Various agents have been used in attempts to mask wound malodour, including scented candles, incense, vanilla beans, and air fresheners (Samala and Davis, 2015; Black and Berke, 2020). Additionally, odour absorbing products such as cat litter and baking powder have been suggested (Samala and Davis, 2015; Black and Berke, 2020). However, the effectiveness of these methods has not been thoroughly investigated, and they remain supportive measures as they do not address the underlying cause of the odour.

E = education and support

As said, wound malodour can cause significant stress and anxiety for both patients and caregivers (Fleck, 2006). Regular re-evaluation of the patient is essential (Black and Berke, 2020). Healthcare professionals should not only assess the wound for signs of improvement or deterioration, but also take the time to understand the concerns of the patient and their family. Particular attention should be given to factors impacting the individual's quality of life, such as pain, poor sleep, anxiety and depression (Samala and Davis, 2015). Developing a patient-centred management strategy helps ensure that patients feel heard as well as addressing concerns that are negatively affecting their quality of life (Samala and Davis, 2015).

Figure 2 shows an example of a pathway to guide malodour management.

Figure 3.
C-Sorb Carbon superabsorbent dressing.

C-SORB CARBON

C-Sorb Carbon is a 2-in-1 product that combines a superabsorbent pad made from SAPs with an integrated carbon layer (*Figure 3*).

C-Sorb Carbon has been developed with the following properties in mind for odour control and exudate management:

- To neutralise odour — the dressing contains a carbon layer. As said, carbon absorbs and traps odour molecules (Probst and Saini, 2024). Wound malodour can significantly impact patient quality of life, leading to distress (Gibson and Green, 2013), embarrassment and social isolation (WUWHS, 2019). However, odour-minimising dressings can positively impact quality of life for both patients and their families (Black and Berke, 2020)
- Absorbency — C-Sorb Carbon is formulated with SAPs. SAPs can absorb a medium-to-high volume of exudate (Browning et al, 2016). Such a dressing property can extend wear time, reduce frequency of dressing changes, which in turn saves valuable nursing time (Gardner, 2016)
- Lock away technology — when fluid is absorbed, the superabsorbent core transforms into a gel to lock in exudate. If bacteria is kept away from the wound bed in such a way, this also prevents periwound maceration (Le Blanc et al, 2021)
- Even fluid dispersion — the gel is designed to evenly distribute exudate across the dressing, so as to prevent uncomfortable bulking in one area
- Soft contact layer — this is designed to minimise adherence to the wound. Non-adherence

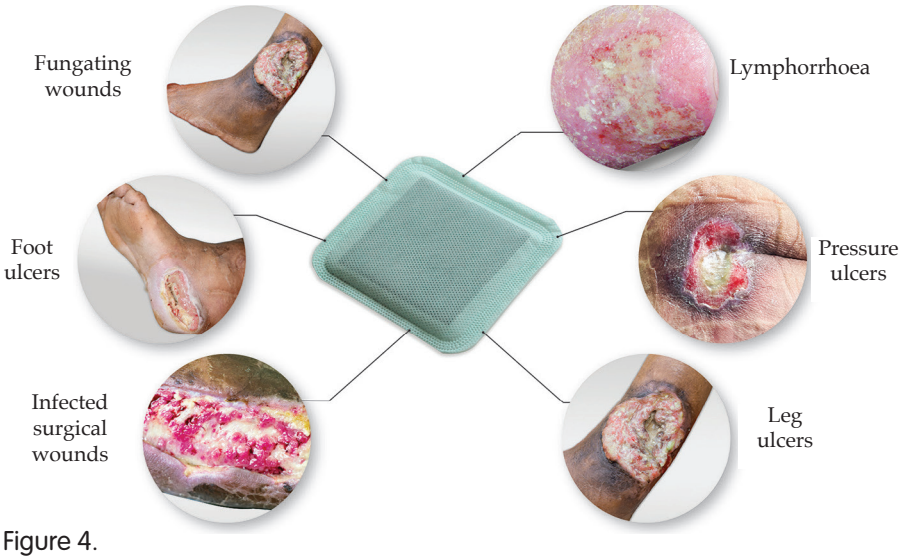


Figure 4.
Indications for C-Sorb Carbon superabsorbent dressing.

Figure 5.
C-Sorb Carbon applied to a fungating breast wound.

of wound dressings reduces the risk of friction and shearing (Punjataewakupt and Aramwit, 2022)

- To be comfortable and conformable — if dressings are flexible and can adapt easily to the contours of the body, this helps with patient comfort during use. Also, MFWs can occur anywhere on the body, which may make application and retention difficult (Naylor, 2002), such as the scalp and breast (*Figure 5*). Thus, absorbent flexible dressings which prevent leakage and periwound maceration are suitable for such wound types (Verdon, 2015; LeBlanc et al, 2021)
- Strikethrough free — the dressing has a fluid repellent backing to help prevent strikethrough. Preventing strikethrough can allow for longer wear time (Browning et al, 2016). Furthermore, strikethrough of exudate can be upsetting for patients, leading to social isolation and reduced quality of life (WUWHS, 2019)
- Suitable under compression — C-Sorb is suitable for use under compression therapy (Surgical Material Testing Laboratory [SMTL], 2019)
- Cost-effective — if dressings can be used for longer due to their absorption capacity, this reduces the frequency of dressing changes (Velickopvic et al, 2024). The carbon layer in C-Sorb Carbon aims to eliminate the need for an extra dressing, making it a versatile primary or secondary dressing that can potentially save both nursing time and resources.

Indications

C-Sorb Carbon is indicated for wet malodorous wounds, e.g. MFWs, pressure ulcers, leg ulcers, foot ulcers and infected surgical wounds (*Figures 4* and *5*). Frequency of dressing changes will depend on the condition of the wound and periwound skin, as well as volume of exudate. C-Sorb Carbon should not be cut, but is available in a range of sizes to suit a variety of wound shapes and sizes (*Table 5*). As the product is non-adherent, it requires securing with bandages, hosiery or surgical tape.

Contraindications

C-Sorb Carbon is not suitable for use on dry or low exuding wounds.

'By adopting a holistic and individualised approach, clinicians can help alleviate the distress caused by wound malodour and enhance the overall care experience.'

CONCLUSION

Wound malodour presents a significant challenge, profoundly affecting patients' physical and emotional wellbeing. Effective management requires a thorough understanding of its underlying causes, regular reassessment, and an emphasis on patient-centred care. Addressing the root cause, such as infection, with appropriate treatments is crucial, alongside the use of odour-controlling dressings and supportive interventions. While masking agents and odour absorbing products may provide temporary relief, they are not substitutes for addressing the primary source of malodour. Healthcare professionals should also prioritise the psychosocial aspects of care, acknowledging patient and caregiver concerns and tailoring management strategies to improve quality of life. By adopting a holistic and individualised approach, clinicians can help alleviate the distress caused by wound malodour and enhance the overall care experience. JCN

REFERENCES

Akhmetova A, Saliev T, Allan IU, et al (2016) A comprehensive review of topical odor-controlling treatment options for chronic wounds. *J Wound Ostomy Continence Nurs* 43(6): 598–609

Baker P, Haig G (1981) Metronidazole in the treatment of chronic pressure sores and ulcers: a comparison with standard treatment in general practice. *Practitioner* 225(1354): 569–73

Black J, Berke C (2020) Ten top tips: managing wound odour. *Wounds Int* 11(4): 8–11

Browne N, Grocott P, Cowley S, et al (2004) Woundcare Research for Appropriate Products (WRAP): validation of the TELER method involving users. *Int J Nurs Stud* 41(5): 559–71

Browning P, White RJ, Rowell T (2016) Comparative evaluation of the functional properties of superabsorbent dressings and their effect on exudate management. *J Wound Care* 25(8): 452–62

Edwards-Jones V (2018) Microbiology and malodorous wounds. *Wounds UK* 14(4): 72–5

Fleck CA (2006) Fighting odor in wounds. *Adv Skin Wound Care* 19(5): 242–4

Fletcher J (2008) Malodorous wounds: Assessment and management. *Wound Essentials* 3: 14–17

Gardner S (2016) Wound absorbent dressings. *Dermatological Nurs* 15(4): 10–19

Table 5: C-Sorb Carbon ordering details and dressing sizes

RHC code	Dressing size (cm)	PIP code	Pack quantity
206510	10x10	422-1800	10
206512	12.5x12.5	422-1768	10
206520	10x20	422-1792	10
206522	20x20	422-1784	10
206530	20x30	422-1776	10

Gethin G, Grocott P, Probst S, Clarke E (2014) Current practice in the management of wound odour: An international survey. *Int J Nurs Stud* 51(6): 865–74

Gethin G, Murphy L, Sezgin D, Carr PJ, McIntosh C, Probst S (2023a) Resigning oneself to a life of wound-related odour — A thematic analysis of patient experiences. *J Tissue Viability* 32: 460–4

Gethin G, Vellinga A, McIntosh C, et al (2023b) Systematic review of topical interventions for the management of odour in patients with chronic or malignant fungating wounds. *J Tissue Viability* 32(1): 151–7

Gibson S, Green J (2013) Review of patients' experiences with fungating wounds and associated quality of life. *J Wound Care* 22(5): 265–75

Guest JF, Fuller GW, Vowden P (2020) Cohort study evaluating the burden of wounds to the UK's National Health Service in 2017/2018: update from 2012/2013. *BMJ Open* 10(12): e045253

International Wound Infection Institute (2022) *Wound Infection in Clinical Practice*. Wounds International, London

LeBlanc, Beeckman D, Campbell K, et al (2021) *Best practice recommendations for prevention and management of periwound skin complications*. Wounds International, London

Li X, Lui F. *Anosmia*. [Updated 2023 Jul 3]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available online: www.ncbi.nlm.nih.gov/books/NBK482152/

Malone M, Bjarnsholt T, McBain AJ, et al (2017) The prevalence of biofilms in chronic wounds: a systematic review and meta analysis of published data. *J Wound Care* 26(1): 20–5

Marshall A (2022) Improving patients' quality of life, self-esteem and body image with odour controlling dressings. *Wounds UK* 18(3): 56–9

Murphy C, Atkin L, Swanson T, et al (2020) Defying hard-to-heal wounds with an early antibiofilm intervention strategy: wound hygiene. *J Wound Care* 29(Sup3b): S1–S26

Naylor W (2002) Malignant wounds: aetiology and principles of management. *Nurs Stand* 16(52): 45–53

Phillips E (2024) What's that smell? The role of microbes in the scented world. *Microcosm* 24: 32–4. Available online: https://ow.ly/GHla50UNHGA

Pramod S, Dumville J, Norman G, Stringer J (2024) A survey of UK nurses about their care of people with malignant fungating wounds. *Eur J Oncol Nurs* 70: 102609

Probst S, Saini C (2024) The management of wound odour and exudate using a multi-purpose dressing — a case series. *J Wound Management* 25(1): 43–7

Punjataewakupt A, Aramwit P (2022) Wound dressing adherence: a review. *J Wound Care* 31(5): 406–23

Samala RV, Davis MP (2015) Comprehensive wound malodor management: win the RACE. *Cleve Clin J Med* 82(8): 535–43

Surgical Medical Testing Laboratory (2019) *Test report: Superabsorbent dressings*. Report No 19/5966/1 SMTL Bridgend

Velickopvic VM, Macmillan T, Lones E, et al (2024) Systematic review and quality assessment of clinical and economic evidence for superabsorbent wound dressings in a population of chronic ulcers. *Int Wound J* 21(3): e14750

Verdon A (2015) Fungating wounds: causes, characteristics and impact on patients. *Wound Essentials* 10(2): 60–3

Watanabe K, et al (2016) Safe and effective deodorization of malodorous fungating tumors using topical metronidazole 0.75 % gel (GK567): a multicenter, open-label, phase III study (RDT.07.SRE.27013). *Support Care Cancer* 24(6): 2583–90

World Union of Wound Healing Societies (2019) *Consensus Document: wound exudate effective assessment and management*. Wounds International, London

Zhao R, Liang H, Clarke E, et al (2016) Inflammation in chronic wounds. *Int J Mol Sci* 17(12): 2085

Zielinska M, Pawlowska A, Orzel A, et al (2023) Wound microbiota and its impact on wound healing. *Int J Mol Sci* 24(24): 17318

KEY POINTS

- Wound malodour is a distressing symptom that significantly impacts the quality of life of patients and their caregivers, often leading to anxiety, stress, and social isolation.
- Despite its significant impact, there is limited guidance in the literature on managing wound malodour.
- The most common wounds associated with malodour are those linked to chronicity and high exudate volume, such as leg ulcers, diabetic foot ulcers, burns and malignant/fungating wounds (MFWs).
- Assessment of malodour is an integral part of holistic assessment; however, it can be challenging and often subjective.
- Successful treatment of malodour should focus on identifying and treating the underlying cause.
- Healthcare professionals should also prioritise the psychosocial aspects of care, acknowledging patient and caregiver concerns and tailoring management strategies to improve quality of life.

Revalidation Alert

Having read this article, reflect on:

- Your knowledge of and how to identify the causes of malodour in wounds
- How to assess such wounds
- Treatment options available
- The emotional distress that malodorous wounds can cause
- Why it is important to be sensitive to the challenges that come with malodorous wounds and mindful of personal reactions.

Then, upload the article to the free JCN revalidation e-portfolio as evidence of your continued learning: www.jcn.co.uk/revalidation

WELCOME TO MICROWORLD®

INDEPENDENT WOUND CARE EDUCATION
THAT INSPIRES HEALING™

April 2021 MICRO20210001

HEALING WOUNDS CAN BE COMPLEX, LEARNING HOW TO DOESN'T NEED TO BE

FOR HEALTHCARE PROFESSIONALS.
FOR PATIENTS. FOR CARERS. FOR STUDENTS.

REGISTER TODAY FOR FREE

www.mymicroworld.online

Microworld is a free, subscription-based educational platform that provides patients, students and heathcare professionals access to engaging, interactive, CPD validated, animated medical content that helps further the understanding of advanced wound care.

Mölnlycke®

GET ANIMATED+ MEDICAL

WOUND CARE TODAY

Muscle pump activation for hard-to-heal leg ulcers

Agnes Collarte, Nichola Dee

Despite advances in wound care, treatment of lower limb ulceration remains suboptimal, with poor outcomes often attributed to inadequate diagnosis, failure to follow evidence-based practice, and variations in care delivery. These shortcomings result in delayed healing, reduced quality of life (QoL), and a significant economic burden on healthcare systems. Compression therapy is the recommended treatment for venous ulcers and ulcers with mixed aetiology, however there are some individuals who may not respond to compression alone or who are unsuitable due to arterial status. Recent advances in adjunctive therapies, such as the geko® device, offer promising results for these patients. This muscle pump activation (MPA) device activates the calf and foot muscle pumps, increasing venous, arterial and microvascular blood flow. This article examines the impact of leg ulceration on healthcare services and patient outcomes, while exploring the potential of the geko® device to improve healing rates and reduce associated costs.

KEYWORDS:
■ Leg ulcers ■ Economic burden ■ Quality of life ■ Assessment
■ Compression therapy ■ Muscle pump activation (MPA)
■ Neuromuscular electrostimulation (NMES)

Leg ulcers are wounds located on the lower leg, typically between the knee and the malleolus, which have not healed after two weeks (National Institute for Health and Care Excellence [NICE], 2013). Leg ulceration can result from various causes, including venous disease, peripheral arterial disease (PAD), mixed venous and arterial disease, lymphoedema, and atypical aetiologies (Isoherranen et al, 2023). This list is not exhaustive, and many leg ulcers are, in fact, multi-aetiological, where multiple comorbidities may contribute to the development of the ulceration (Isoherranen et al, 2023). This article focuses on the most common types of leg ulcers: venous, mixed, and arterial ulcers.

Agnes Collarte, tissue viability specialist nurse lead, St Charles Centre for Health and Wellbeing, London; Nichola Dee, practice nurse, The Bay Medical Practice, Isle of Wight

It has been well documented that treatment of lower limb ulceration is often suboptimal (Gray et al, 2018; Guest et al, 2018; Phillips et al, 2020). Poor outcomes for patients with leg ulcers have been attributed to many factors, including:

- Inadequate diagnosis
- Inability to identify wound type correctly
- Underuse of evidence-based practice
- Variations in care (Gray et al, 2018; Guest et al, 2018; Phillips et al, 2020).

Failure to diagnose wound aetiology correctly and implement best practice guidelines can result in delayed wound healing, negatively affect an individual's quality of life (QoL), and significantly increase the economic burden that chronic wounds impose on healthcare systems (Guest et al, 2018; Phillips et al, 2020).

ECONOMIC BURDEN OF LEG ULCERATION

Guest et al (2020) reported that approximately 2% of the adult population in the UK experiences lower limb ulceration, with venous leg ulcers (VLUs) being the most prevalent type (Gray et al, 2018; Wounds UK, 2019). Compression therapy is recommended as first-line treatment for VLUs (Wounds UK, 2019; Isoherranen et al, 2023; National Wound Care Strategy Programme [NWCSP], 2024). Despite this, several studies have highlighted significant shortcomings in the care of individuals with VLUs, such as failure to exclude PAD through ankle brachial pressure index (ABPI) measurements and the lack of appropriate initiation of compression therapy (Gray et al, 2018; Guest et al, 2018; Phillips et al, 2020). These care deficiencies contribute to the economic strain on an already overburdened healthcare system (Wounds UK, 2022).

Guest et al (2018) estimated that the annual cost of treating a leg ulcer is approximately £7,500, but this figure increases by four to five times when the ulcer remains unhealed. More recently, Phillips et al (2020) estimated that the cost of treating VLUs in Wales accounts for approximately 1.2% of the NHS budget, with costs exceeding £2 billion across the UK.

The majority of leg ulcer care is delivered by community nurses (Guest et al, 2018; Phillips et al, 2020), making the time spent on community nursing visits a significant cost driver. This places additional strain on healthcare resources, particularly considering the 43% reduction in the number of community nurses over the past decade (Queen's Nursing Institute [QNI], 2019).

geko®
wound therapy

Helping patients feel like themselves again

The geko® device reduces pain[1] and doubles the rate of healing in venous leg ulcers versus compression alone[2]

VLUs affect one in 500 adults in the UK[3], costing the national healthcare system around **£2 billion annually**[3]

The study **compared standard of care with and without the geko device** in patients with hard-to-heal VLUs[2]

The geko device, a muscle pump activator (MPA), **increases venous, arterial and microcirculatory blood flow**[1], transporting oxygenated blood to the wound bed **accelerating wound healing**[4]

Reduces pain[1]
Accelerates healing[2]
Improves concordance[5]
Available on prescription and NHSSC

VLUs, venous leg ulcers.

1. Jones N *et al.* Br J Nurs 2018; 27(20): S16-S21. **2.** Bull, RH, Clements, D, Collarte, AJ, Harding, KG. The impact of a new intervention for venous leg ulcers: A within-patient controlled trial. Int Wound J. 2023; 1- 9. doi:10.1111/iwj.14107. **3.** Phillips, CJ, Humphreys, I, Thayer, D, *et al.* Cost of managing patients with venous leg ulcers. Int Wound J. 2020; 17: 1074– 1082. https://doi.org/10.1111/iwj.13366. **4.** Das S *et al.* Int Wound J 2021; 18(2): 187-93. **5.** Harris et al. Evaluation of a muscle pump-activating device for non-healing venous leg ulcers 2017. Medicalhelplines.com Inc and John Wiley & Sons Ltd doi: 10.1111/iwj.12784.

firstkind
living science

www.gekodevices.com

MDADWND0770v4

The geko® device W-3 is marketed in the US for Edema reduction and Increasing microcirculatory blood flow in lower limb soft tissue of patients with venous insufficiency and/or ischemia while the device is active.

The potential to positively influence cost drivers, such as prolonged healing times and excessive use of non-evidence-based care, as well as reducing nursing time spent on patient care, lies in practices that include minimising variations in care, ensuring patients undergo full comprehensive assessment (*Table 1*), accurately identifying wound aetiology, and implementing a standardised approach to care delivery (NWCSP, 2024).

IMPACT OF LEG ULCERATION ON QUALITY OF LIFE

A non-healing leg ulcer can have a significant impact on an individual's QoL and may be multifaceted (Issoherranen et al, 2023). Patients' experiences can vary and poor QoL has been associated with:

- Embarrassment due to leakage from exudate and odour
- Pain
- Reduced mobility
- Anxiety
- Depression
- Social isolation
- Sleep disturbance (Harding et al, 2015).

In addition, time lost from work and the potential financial consequences can increase the stress and anxiety an individual experiences (Joaquim et al, 2018). Failure to consider the patient's experience when planning care may lead to a lack of alignment in the care process and diminished trust in both the clinician and recommended treatment (Issoherranen et al, 2023). Furthermore, proactive symptom management has been demonstrated to improve patient QoL and encourage patient engagement (Weir and Davies, 2023).

Pain is one of the most reported symptoms of a leg ulcer, with estimates suggesting that up to 80% of patients experience mild-to-moderate pain (Leren et al, 2020). Wound-related pain is complex and multidimensional, influenced by various factors such as infection, tissue damage, nerve involvement, ischaemia, psychological factors, and medical procedures, such as dressing changes and debridement (Holloway et al, 2024). Holistic pain management starts with accurately identifying the type of pain (*Table 1*), recognising any triggers, and utilising a validated pain assessment tool. After this, appropriate interventions for effective pain management can be identified and implemented (Holloway, 2024).

Table 1: Components of comprehensive leg ulcer assessment (adapted from Harding et al, 2015; NWCSP, 2024)

History	▸ Wound history — duration of wound, how it occurred, previous ulceration and treatment ▸ Patient history — comorbidities and medications
Examination	▸ Size of wound ▸ Tissue within the wound bed ▸ Presence of infection ▸ Exudate volume ▸ Edge of wound ▸ Condition of surrounding skin
Pain	▸ Measure type of pain (e.g. procedural, nociceptive or neuropathic) ▸ Record duration of pain ▸ Measure level of pain using a validated measurement tool ▸ Establish current analgesia regimen and its effectiveness ▸ Identify any coping mechanisms the patient uses to manage or reduce pain (Holloway, 2024)
Nutrition	▸ Use a validated nutritional assessment tool
Psychological needs	▸ Establish what is important to the patient and how this can be achieved through common goals
Vascular status	▸ Undertake ABPI/ toe brachial pressure index (TBPI) to exclude or confirm the presence of peripheral vascular disease
Establish a diagnosis	▸ Use the information from the assessment to formulate an accurate diagnosis
Formulate treatment plan based on assessment findings and diagnosis	▸ Use national guidance to formulate plan of care according to aetiology and wound environment ▸ Where possible, empower the patient to be involved in the planning of care

AETIOLOGY AND TREATMENT OF LEG ULCERATION

Treatment of a leg ulcer depends on its aetiology (Sibbald et al, 2024). This is achieved through undertaking a comprehensive assessment within 14 days of first presentation (*Table 1*).

Venous leg ulcers result from venous hypertension, which is attributed to valve incompetence and poor calf muscle function (Wounds UK, 2024). This leads to lower limb oedema, skin changes, and ulceration (Sibbald et al, 2024). First-line treatment for a venous leg ulcer is the use of high-level compression therapy (40mmHg) to assist in reversing venous hypertension and reducing oedema (NWCSP, 2024).

Arterial ulcers are caused by PAD, which is a narrowing in the peripheral arteries with fatty deposits restricting the oxygen supply to surrounding tissue (Issoherranen et al, 2023). Patients with arterial ulcers require rapid referral to the vascular team to assess for the potential for revascularisation (Sibbald et al, 2024).

Mixed aetiology ulcers have elements of both venous and arterial disease. Referral to vascular services is recommended to establish level of PAD. Treatment with reduced compression (20mmHg) can be started if oedema is present and there are no red flags or evidence of acute or limb threatening ischaemia (NWCSP, 2024).

There are some patients that fail to heal despite optimum use of compression therapy, and there is also a small proportion of patients

Red Flags

Refer immediately to the appropriate specialty if patient displays any of the following:

- Acute infection
- Symptoms of infection
- Acute or suspected limb threatening ischaemia
- Suspected deep vein thrombosis (DVT)
- Bleeding varicose veins

(NWCSP, 2024).

who are unable to tolerate the recommended level of compression due to pain or vascular status (Stacey et al, 2024). For these patients, adjunctive therapies such as a muscle pump activation (MPA) device, i.e. geko®, may be considered (Sibbald et al, 2024).

WHAT IS MPA — GEKO®

The geko® device is a compact, disposable, battery-powered muscle pump activator designed for external application to the leg. This self-adhesive device is placed on the outer side of the knee, before the peroneal nerve bifurcates. The built-in electrodes stimulate the common peroneal nerve, which controls muscle contractions in the calf and foot. By stimulating this nerve, the device can activate the calf muscles to contract isometrically without interfering with normal limb movement or patient mobility. This muscle contraction increases blood flow from the lower limbs to the heart, improving venous return, enhancing local circulation, and reducing the risk of venous thrombosis (Das et al, 2021).

The geko® device is CE marked and the intended use is for:

- Increasing blood circulation
- Promoting wound healing
- Treatment of venous insufficiency and ischaemia
- Prevention and treatment of oedema.

The geko® device may be considered for lower limb wounds if there is no improvement following 28 days of standard care treatment. A pathway to support appropriate use of geko® is provided in *Figure 1*.

Evidence for the geko® device in clinical practice

A study by Bosanquet et al (2020) sought to measure the effect of neuromuscular electrostimulation (NMES) of the common peroneal nerve using the geko® device on blood flow in eight patients with arterial ulcers. Mean blood flow (flux) and pulse amplitude (pulsatility) were measured at baseline and at intervention. All eight patients showed a significant increase in perfusion to both the wound bed and the surrounding peri-wound area while using the geko® device. Bosanquet et al acknowledged that this was a small study and recommended larger cohort studies. However, the findings suggest that the geko® device may positively impact healing by increasing blood flow to the wound bed in patients who are unable to undergo revascularisation.

Bull et al (2023) conducted a self-controlled study involving 60 patients with venous leg ulcers which had been present for more than six weeks. The primary outcome was the rate of healing, measured by the advancement of the wound margin. This novel approach enabled the study to be conducted over a shorter period (four weeks), in contrast to most randomised controlled trials (RCTs) that use complete healing as the endpoint, which typically extends the study duration. Additionally,

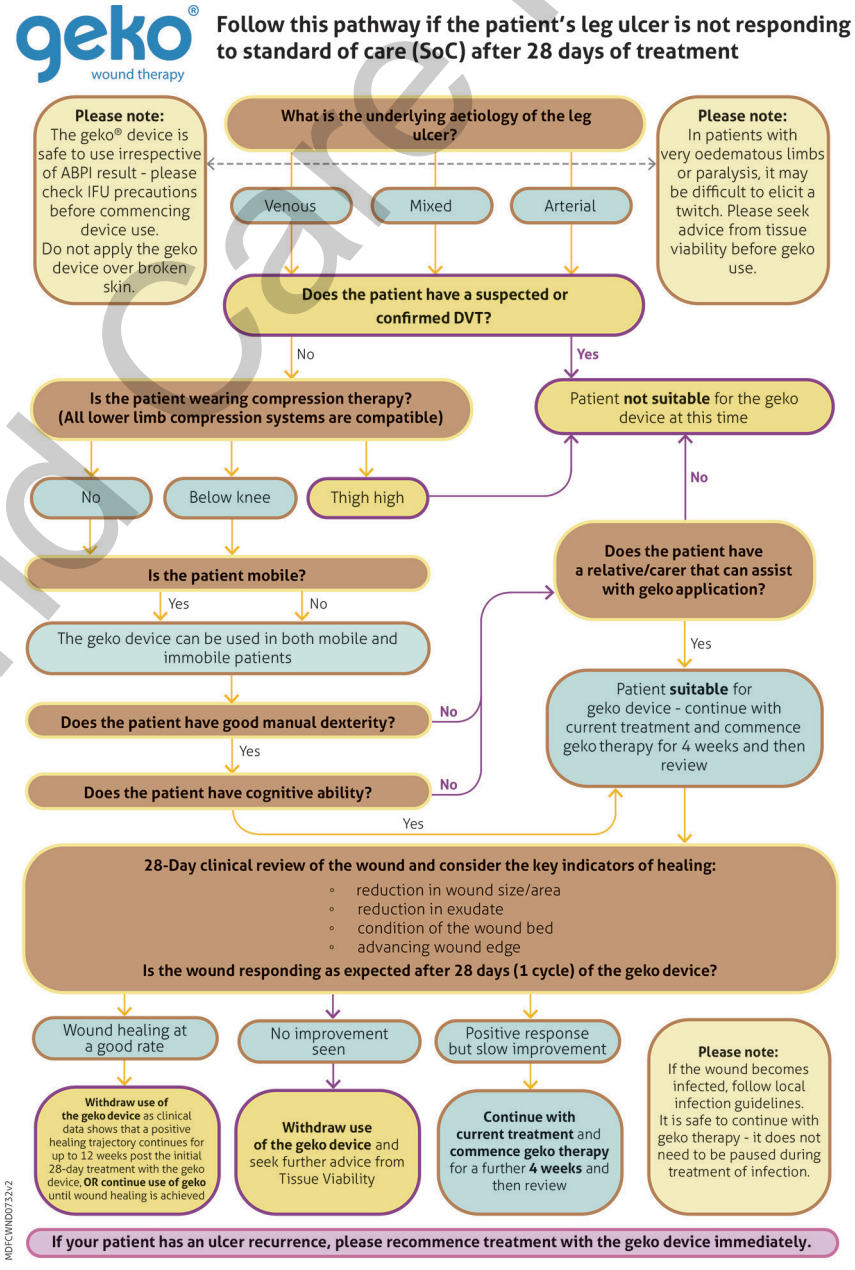


Figure 1.
Wound care pathway using geko® device.

this method removes the variability in chronic ulcers, which may follow different healing trajectories.

Twenty-two patients were randomly assigned to receive the standard of care (SoC), which included compression therapy (either multilayer compression bandages or compression hosiery). An additional 29 patients were randomised to receive SoC plus MPA for 12 hours per day. The study demonstrated that in the group that received compression plus MPA, healing rates over the four-week period increased two times faster than the compression alone group. At three-month follow-up, 42% in the compression plus MPA group had healed compared to 27% in the control group. Furthermore, patients reported that the MPA device was easy to use and did not report any issues with application and use of the device.

In an evaluation by Jones et al (2018), the secondary outcome of interest was the reduction of reported pain in 52% of patients with painful venous and mixed aetiology ulcers following use of the geko® device.

Tuson et al (2024) evaluated the cost-effectiveness of the geko® device in a RCT conducted across multiple centres in the UK. The trial involved 51 patients with chronic venous ulceration over a 12-month period, with 29 patients in the intervention group (geko® plus SoC — compression therapy) and 22 in the control group (SoC alone). The primary aim was to assess potential cost savings for the NHS, measured by the incremental cost per quality-adjusted life year (QALY). The study indicated that combining geko® with SoC increased healing rates significantly compared to SoC alone (25.3 weeks versus 37.6 weeks respectively). Tuson et al further concluded that the healing rate could potentially be increased by 68% resulting in an estimated cost saving of £774.14 per patient following the implementation of the geko® device alongside SoC. The potential cost savings could help alleviate the financial burden associated with chronic leg ulcers by improving healing rates and enabling more efficient resource allocation, including reduced district nurse time and decreased use of wound care products.

Case series

The first author conducted a case series evaluation on the use of a MPA device (geko®) as adjunctive therapy to SoC (compression therapy) for a four-week period in five patients with chronic, non-healing venous leg ulcers whose wounds had shown no signs of healing after receiving gold-standard management of compression therapy for four weeks (*Figure 2*) (Collarte, 2024).

Patients were given full instructions on how to apply and remove the device and all five patients wore it for 12 hours per day, seven days per week. Patients continued with SoC during the evaluation period and were evaluated by a specialist nurse. The rate of wound healing was calculated on day 28 and day 56 as part of the normal clinical review process. This was a standard clinical assessment (aligned to the patient pathway). Patients were asked to verbally report levels of wound-related pain using a numerical rating scale of 0–10, both before and during treatment with MPA. Patient acceptance of and ability to self-manage were also recorded.

As said, the geko® device was used alongside compression therapy for four weeks. After this period, two patients had fully healed, while the remaining three continued treatment for an additional four weeks, ultimately resulting in complete healing for all patients (*Figure 2*). Two patients reported pain at the start of the intervention, both of whom experienced pain reduction after using the device. All patients found the device easy to use.

This case series demonstrates how the MPA device was used to manage a group of patients with non-healing, chronic venous leg ulcers in a real-world clinical setting. The results of this evaluation emphasise the advantage of integrating the MPA device into a leg ulcer treatment regimen and demonstrated improved healing and health economic outcomes for patients with VLUs who were not previously responding to SoC protocols.

Case reports one and *two* (*pages 34–35*), conducted by the first and second author respectively, further demonstrate how the geko® device can be used in clinical practice to achieve positive outcomes for patients with non-healing wounds.

CONCLUSION

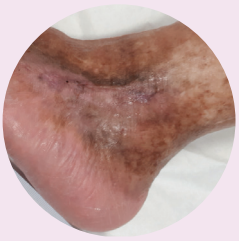
Chronic leg ulcers are among the most common types of wounds, significantly increasing healthcare costs and negatively affecting patient QoL. Successful treatment hinges on conducting a thorough assessment and establishing an accurate diagnosis to provide the most appropriate care for wound healing. However, a small subset of patients may not tolerate treatments like compression therapy, or fail to respond to it, while others may be unsuitable candidates for revascularisation. For these patients, adjunctive therapies such as MPA (geko®) may be of benefit.

Studies have demonstrated the effectiveness of geko® in enhancing wound healing, particularly in patients with non-healing ulcers or those unable to tolerate high-level compression therapy. Clinical trials have shown significant improvements in healing rates, reported pain reduction, and overall patient satisfaction with the geko® device. Additionally, the device offers potential cost savings by reducing treatment duration and resource utilisation, including nursing time and wound care product usage. By improving healing rates and reducing care variability, adjunctive interventions like the geko® device may help alleviate the financial burden of chronic leg ulcers on healthcare systems while improving patient QoL. JCN

This paper is supported by Firstkind Ltd.

25th April — baseline

24th May — 1st follow-up



Patient one

- 72-year-old female
- PMH – varicose veins, fatty liver, hypertension
- Ulcer duration – six weeks
- Pain score at baseline – 0
- Wound care regimen – DACC primary dressing, short-stretch compression bandaging
- MPA device discontinued at four-week review as wound fully healed

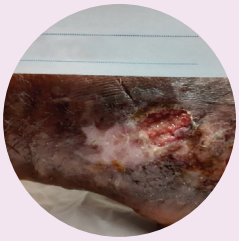
17th May — baseline

14th June — 1st follow-up

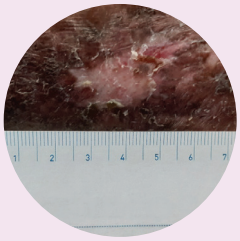
Patient two

- 62-year-old female
- PMH – hypertension, asthma
- Ulcer duration – 11 weeks
- Pain score reported by patient – 0
- Wound care regimen – silicone foam primary dressing, short-stretch compression bandaging
- MPA device discontinued at four-week review as wound fully healed

9th Sept — baseline



7th Oct — 1st review

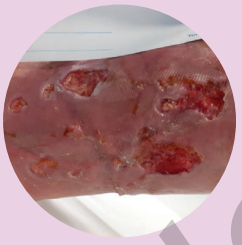


4th Nov — 2nd review

Patient three

- 67-year-old female
- PMH – osteoarthritis, epilepsy, left ventricular hypertrophy, alpha thalassaemia, historic DVT
- Ulcer duration – 14 weeks
- Pain score reported by patient – 10 (pain score 4 after one week; pain score 1 after four weeks of MPA)
- Wound care regimen – cadexomer iodine primary dressing, compression bandaging
- MPA device discontinued at eight-week review as wound fully healed

8th July — baseline



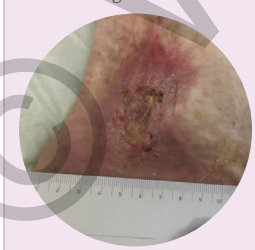
5th Aug — 1st review

2nd Sept — 2nd review

Patient four

- 59-year-old male
- PMH – type 2 diabetes, gout
- Ulcer duration – six weeks
- Pain score reported by patient at baseline – 4 (no further pain scores reported)
- Wound care regimen – silver foam primary dressing, compression bandaging
- MPA device discontinued at eight-week review as wound fully healed (wound had healed at week five but patient continued with MPA device until review)

25th Aug — baseline



26th Sept — 1st review

20th Oct — 2nd review

Patient five

- 60-year-old male
- PMH – COPD, alcohol dependence, depressive disorder
- Ulcer duration – nine weeks
- Pain score reported by patient at baseline – 0
- Wound care regimen – silver foam primary dressing, compression bandaging
- MPA device discontinued at eight-week review as wound fully healed

Figure 2.
Case series of five patients who used the geko® device.

CASE REPORT ONE

Mrs Watts (pseudonym) was a 78-year-old female who was referred to the tissue viability team with a large wound to her right lower leg that had been present for two months. She lived with her husband and relied on a wheelchair to go out due to extreme wound pain. Due to leaking bandages, Mrs Watts slept in a chair as she did not want to ruin the mattress on her bed. Her past medical history included:

- Hypothyroidism
- Closed fracture of the lateral malleolus
- Seropositive rheumatoid arthritis
- Thyrotoxicosis
- Total knee replacement.

On initial assessment, the leg ulcer was almost circumferential measuring 19.0x22.8cm. The wound bed was covered with 90% slough and 10% granulation tissue (*Figures 3* and *4*). The presence of oedema and cellulitis was noted to the limb and the periwound skin was macerated due to a high volume of exudate. At the time of the assessment, the ankle measured 26.8cm and calf 43.2cm. Ankle brachial pressure index (ABPI) measurements were right limb=0.96, left limb=1.02. The wound was diagnosed as a venous ulcer.

Mrs Watts reported continuous pain at a severe level of 10 using a verbal numerical rating scale of 0–10 (where 0=no pain and 10=worst pain). For pain management, she relied on co-codamol 30mg/500mg, taking two tablets four times a day. She was unable to increase her analgesia due to various previous drug reactions, which meant that her pain was not adequately controlled.

Despite various previous treatments with antimicrobial dressings and reduced compression therapy, Mrs Watts' wound was showing no signs of healing. Due to her numerous allergies, she was anxious about trying new dressings as she thought that they may increase her pain and cause her wound to deteriorate.

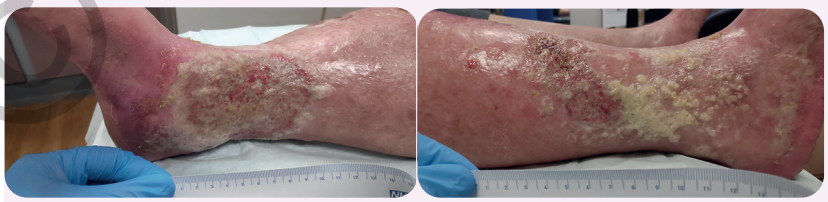
Due to the static nature of the wound and severe pain experienced, treatment with a muscle pump activation (MPA) device (geko®) was discussed as a wound management option, with the aim of preventing further infection, reducing pain and exudate volume, decreasing oedema, and promoting healing. The treatment regimen included the use of dressings, reduced compression bandaging, and the geko® device.

Mrs Watts was reluctant at first but eventually agreed to the geko® device. She was given education on how to apply and remove it and an appropriate skin care regimen to prevent further skin breakdown. She wore the geko® device for 12 hours per day, seven days per week.

Mrs Watts tolerated treatment with the geko® device well. After just 24 hours she reported that her pain had greatly reduced and that she was more than happy to continue with the therapy. Over the next 10 weeks her wound showed progress. It reduced in size and exudate volume decreased to the point where she was able to sleep in the bed with her husband again. Due to the reduction in pain, Mrs Watts could mobilise with the use of two sticks instead of using a wheelchair. She was also able to tolerate 40mmHg compression instead of a reduced bandage system. By the end of the treatment period with the geko® device, her ankle circumference measured 21.5cm and her calf 33.3cm.

The tissue viability team were amazed at the improvements in Mrs Watts' wound after adding the geko® device to her treatment regimen. After 10.5 weeks her wound measured 2x2cm and treatment with the device was discontinued (*Figure 5*). Her wound went on to completely heal three weeks later.

This case emphasises the challenges patients living with chronic wounds often face, as well as for clinicians. In this case, there was minimal choice in treatment options due to the patient's previous adverse reactions. Through integrating geko® device therapy into the wound management plan, Mrs Watts' wound and associated symptoms improved significantly, highlighting the importance of adaptive treatment strategies to achieve better outcomes for patients with non-healing wounds.



Figures 3 and 4.
Initial presentation (15th January, 2024).

Figure 5.
At 10.5 week assessment (2nd April, 2024).

CASE REPORT TWO

This case describes the wound management of Jack (pseudonym), a 67-year-old gentleman with a mixed aetiology wound to his leg and a neuroischaemic ulcer to the dorsum of his foot, which had both been present for over five years. Jack had an extensive medical history of double heart bypass surgery, cerebrovascular accident (CVA) and type 2 diabetes, which was controlled with both insulin and tablets. Jack lived alone and had limited mobility, using a mobility scooter to get around.

Jack was referred to the practice nurse by his GP for assessment and management of a non-healing wound to the pre-tibial area of his left leg. He was already under the care of the specialist podiatrist for management of his diabetic foot ulcer. On presentation, his leg wound measured 2.5cm length and 3.5cm width, with 80% granulation tissue and 20% slough and minimal exudate. Jack reported a pain score of 5/10 and was taking gabapentin regularly. The aims of wound management were to reduce oedema and heal both the wound to his leg and to the dorsum of his foot.

Compression therapy was contraindicated due to the risks to his neuroischaemic diabetic foot wound. As Jack's wounds were showing no signs of healing, it was decided that a muscle pump activation (MPA) device (geko®) should be added as an adjunctive therapy to the existing wound management regimen to aid healing by augmenting blood flow to his limb and wound beds.

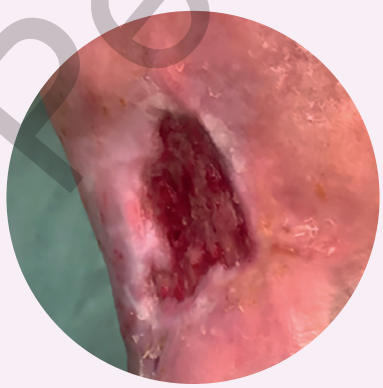
Jack was taught how to apply and remove the MPA device, which was positioned to the skin over the common peroneal nerve at the head of fibula on his affected leg. A regular twitch of the foot indicated that the calf and foot pumps were activated. This optimum positioning of the device was marked so that he could change the device at home on a daily basis. The usage was 12 hours on and 12 hours off each day for seven days a week.

Jack was keen to have the MPA device added to his wound management regimen. It gave him hope that his wounds might eventually be healing after being present for so long. He found the application and removal of the MPA device extremely easy and both his leg and foot wounds started to reduce in size. Jack reported a reduction in his pain and was able to lessen his use of analgesics. Over 12 weeks, both his wounds had reduced in size by approximately 50%. Jack reported that his mood had lifted due to the improvements in his wounds and the reduction in pain. He also stated that he enjoyed being able to take part in his own care as it made him feel involved and slightly more independent.

Having both a mixed aetiology leg ulcer as well as a neuroischaemic diabetic foot ulcer presented a challenge in deciding on the best wound management regimen for this patient. By adding the MPA device to standard care, Jack's wounds made significant progress after five years of non-healing. His quality of life improved and he felt involved in his wound care for the first time.

As demonstrated in this case, the MPA device provided an effective adjunctive treatment option for hard-to-heal lower limb wounds.

Leg wound at start of MPA treatment (day 0)



Foot wound after one week of MPA treatment

Leg wound after 12 weeks of MPA treatment

Foot wound at 12 weeks of MPA treatment

Figure 6.
Wound care progress of Jack's wounds using MPA treatment.

REFERENCES

Bosanquet D, Ivins N, Jones N, Harding KG (2020) Microcirculatory flux and pulsatility in arterial leg ulcers is increased by intermittent neuromuscular electrostimulation of the common peroneal nerve. *Ann Vas Surg* 17: 308–14

Bull RH, Clements D, Collarte AG, Harding KG (2023) The impact of a new intervention for venous leg ulcers: A within patient-controlled trial. *Int Wound J* 20(6): 2260–68

Collarte A (2024) *Evaluating a neuromuscular electrostimulation (NMES) device as part of the treatment pathway for patients with non-healing venous ulcers — a case series*. Poster presentation. EWMA, London

Das SK, Dhoonmoon L, Chhabra (2021) Neuromuscular stimulation of the common peroneal nerve increases arterial and venous velocity in patients with venous leg ulcers. *Int Wound J* 18(2): 187–93

Gray T, Rhodes S, Atkinson R, et al (2018) Opportunities for better value wound care: a multiservice, cross-sectional survey of complex wounds and their care in a UK community population. *BMJ Open* 8: e019440

Guest JF, Fuller GW, Vowden P (2018) Venous leg ulcer management in clinical practice in the UK: costs and outcomes. *Int Wound J* 15(1): 29–37

Guest JF, Fuller GW, Vowden P (2020) Cohort study evaluating the burden of wounds to the UK's National Health Service in 2017/2018: update from 2012/2013. *BMJ Open* 10: e045253

Harding K, et al (2015) *Simplifying venous leg ulcer management. Consensus recommendations*. Wounds International, London

Holloway S, Ahmajarvi K, Frescos N, et al (2024) Holistic management of wound-related pain. *J Wound Management* 25(1) supp1: s1–s84

Isoherranen K, Montero EC, Atkin L, et al (2023) Lower leg ulcer diagnosis and principles of treatment, including recommendations for comprehensive assessment and referral pathways. *J Wound Management* 24(2 Sup1): s1–76

Joaquim F, Silva RM, Garcia-Caro M, et al (2018) Impact of venous ulcers on patients' quality of life: an integrative approach. *Rev Bras Enferm* 71(4): 2021–9

Jones NJ, Ivins N, Ebdon V, Hagelstein S, Harding KG (2018) Neuromuscular electrostimulation on lower limb wounds. *Br J Nurs* 27(2): S16–S21

Leren L, Johansen E, Eide H, Falk RS, Juvet LK, Ljosa TM (2020) Pain in persons with chronic venous leg ulcers: A systematic review and meta-analysis. *Int Wound J* 17(2): 466–84

National Wound Care Strategy Programme (2024) *Lower Limb Ulcerations — Leg Ulcer Recommendations. National wound care strategy*: Available online: https://ow.ly/KfXx50UMrZl

National Institute for Health and Care Excellence (2013) *Varicose veins: diagnosis and management*. Available online: www.nice.org.uk/guidance/cg168 (accessed 2 October, 2024)

Phillips CJ, Humphreys I, Thayer D, et al (2020) Cost of managing patients with venous leg ulcers. *Int Wound J* 17(4): 1074–82

Queen's Nursing Institute (2019) *Outstanding models of district nursing — A joint project identifying what makes an outstanding district nursing service*. Available online: qni.org.uk

Sibbald RG, Geng RSQ, Slomovic J, Stacey M (2024) The muscle pump activator device: From evidence to lived experiences. *Int Wound J* 21(8): e14949

Stacey MC, Sibbald RG, Evans R (2024) Continuous muscle pump activation by neuromuscular electrical stimulation of the common peroneal nerve in the treatment on patients with venous leg ulcers: a position paper. *Int Wound J* 21(9): e70040

Tuson R, Metry A, Harding K (2024) Cost-effectiveness analysis of the geko™ device (an NMES technology) in managing venous leg ulcers in UK healthcare settings. *Int Wound J* 21(10): e70048

Weir D, Davies P (2023) The impact of venous leg ulcers on a patient's quality of life: considerations for dressing selection. *Wounds Int* 14(1): 36–41

Wounds UK (2019) *Best Practice Statement: Addressing complexities in the management of venous leg ulcers*. Available online: www.wounds-uk.com

Wounds UK (2022) *Best Practice Statement: Holistic management of venous leg ulceration (second edition)*. Available online: www.wounds-uk.com

Wounds UK (2024) *Best Practice Statement: Primary and secondary prevention in lower leg wounds*. Available online: www.wounds-uk.com

Expert comment

As a clinician, making a meaningful difference to the lives of our patients is paramount. The widespread challenge of non-healing wounds highlights the critical need to address gaps in care by ensuring that treatments are both evidence-based and cost-effective. For venous leg ulcers (VLUs), compression therapy remains the gold standard. However, healing may be stalled in some cases due to complex comorbidities or an inability to tolerate compression therapy. For these patients, adjunctive therapies such as muscle pump activation (MPA) have demonstrated many significant benefits. In my experience, the geko® device has proven to be a valuable addition to standards of care, delivering positive outcomes by accelerating healing, reducing wound-related burdens, and enhancing patient quality of life. Notably, its use has also been associated with a marked reduction in pain, further supporting patient comfort and recovery.

Patient stories serve as a compelling way to highlight the transformative impact of innovative treatments. Our patient accounts have consistently demonstrated the meaningful difference the geko® device has made in their lives, offering renewed hope for healing their wounds. Moreover, these experiences highlight the significant positive effects on aspects of daily living that are most important to them, enhancing their overall quality of life.

Providing a solution that fosters hope and optimism in patients can improve adherence to treatment plans, empower individuals to take greater control over their care, and ultimately contribute to better outcomes. By integrating therapies like geko® into the broader spectrum of wound care, we can continue to make a profound difference for our patients in clinical practice.

Joy Tickle
Tissue viability consultant, Hampshire and Isle of Wight Health Care

Acroangiodermatitis or Pseudo-Kaposi sarcoma: an overview

Clare Anvar

Acroangiodermatitis (AAD), or Pseudo-Kaposi sarcoma (PKS), is a rare, benign skin condition, which can be seen by community nurses or in lymphoedema clinics, as it occurs in patients with lower limb oedema, chronic venous insufficiency (CVI), varicose vein removal, paralysis, congenital arteriovenous malformations (such as Klippel-Trenaunay and Parkes-Weber syndromes), or iatrogenic malformations caused by renal dialysis shunts or prosthetic suction limbs. AAD should be diagnosed by biopsy and differentiated from Kaposi sarcoma (KS), a rare malignancy with a similar presentation, which is possible through histological differences. However, as said, the two conditions do present similarly, especially in the case of homosexual/bisexual men or human immunodeficiency virus (HIV) positive patients, as even with restored immune systems and an undetectable viral load, they are 30 times more likely to contract KS, which is malignant, than the general population. This article presents a clinical case, which is contrasted with past international case studies to portray a collective overview of AAD/PKS, and how to manage it effectively from the sparse literature available.

KEYWORDS:
- Acroangiodermatitis (AAD)
- Pseudo-Kaposi sarcoma (PKS)
- Arteriovenous malformations
- Chronic venous insufficiency
- Non-healing leg ulcer

There are a number of underlying causes of oedema and venous ulcers which must be addressed before a patient can heal. Regularly encountered co-morbidities include chronic heart failure and diabetes mellitis. This article aims to raise awareness of the rare condition of acroangiodermatitis (AAD) or Pseudo-Kaposi sarcoma (PKS — hereinafter referred to as AAD), to add to the differential diagnosis of non-healing venous leg ulcers. In the case study presented, a misunderstanding of the diagnosis of AAD from a biopsy by the patient led to six months' deterioration without treatment.

Clare Anvar, clinical massage specialist; clinical therapy advisor, Lipoedema UK

The author, although aware that Kaposi sarcoma (KS) was a malignancy from past employment with an acquired immunodeficiency syndrome (AIDS) charity, was unfamiliar with AAD and so undertook a literature review to understand the cause, pathophysiology, differential diagnosis and treatment options for this benign condition.

THE CASE

In September 2023, the author received a referral letter for lymphoedema management from a consultant orthopaedic surgeon for a fit, healthy, stylish, shy woman with a body mass index (BMI) of 22, aged 71, with subcutaneous oedema and chronic venous insufficiency (CVI) of the lower right leg and ankle, which had been present for seven months. This was causing considerable distress and difficulty in wearing shoes. She had no history of trauma, and a magnetic resonance imaging (MRI) scan showed no arthritic changes or structural damage to bones or tissues. Her ankle brachial pressure index (ABPI) measurement was normal.

Initial consultation

The patient revealed that 20 years ago she had suffered from large varicose veins, which had been ligated and stripped from both legs; clinically, this constitutes significant historical trauma to both lymphatic and venous systems (Rudström et al, 2007; Pittaluga and Chastanet, 2012; Mine et al, 2021).

At onset in February 2023 following a GP appointment, a private dermatologist was consulted, who performed a biopsy, which led her to reach a diagnosis of AAD. However, the patient subsequently insisted that the results revealed 'sun damage'. She returned to the GP in May 2023, who prescribed 5% fluorouracil cream (for actinic keratosis) and 1% hydrocortisone cream for the 'sun damage' (*Figure 1*). These were applied to a small area but swiftly discontinued, as 'they didn't work'. In August, the patient consulted the orthopaedic surgeon who referred her to the author's lymphoedema/surgical recovery clinic.

Initial assessment

The author was shocked when first examining the patient, as the presenting skin condition neither made sense, nor was recognised (*Figure 2*). Oedema was secondary to red/purple, scaly, itchy, leaking patches and large thick plaques of dead skin on the legs and ankle, which were in poor condition.

Figure 1.
Patient photographs in May 2023.

Actions taken

The patient was anxious about making the condition worse and was not in a financial position to continue ongoing private therapy at the author's clinic. Both legs were massaged by the author and 45% urea cream was applied. The right leg was cleansed with a debridement pad and bandaged with a two-layer compression system — this leg being the target of treatment, as due to oedema she could not fit a shoe. The author also asked the patient for the biopsy results, pertaining paperwork, prescriptions and any retrospective photographs of the onset and progression of the condition. The patient was given advice on daily moisturising and compression therapy was ordered: two pairs of two-piece, below-knee, compression class 2 garments for ease of application (as patient was unsure about using any compression), and two cotton, ribbed, below-knee garments for overnight use.

The biopsy report and repeat prescriptions were delivered by the patient the following day. The bandage system had been removed by the patient overnight due to discomfort and fear of exacerbating the oedema. The diagnosis from the biopsy report was 'mild atypia suggestive of actinic keratosis (the aforementioned "sun damage") on a background of AAD'.

The author thus undertook a literature review to understand the pathophysiology of AAD, following which, emails were sent by the author to the GP, consultant dermatologist and referring surgeon, requesting reviews from all three healthcare professionals, plus referral to the NHS lymphoedema service (as the patient could not afford the private service offered by the author). The suggested treatment options stated in the research papers (which were attached to the emails) were oral erythromycin 500mg 4 x daily for three months (Samad and Dodds, 2002), or oral dapsone, 50mg 2 x daily (Singh and Manchanda, 2014), plus steroid cream and compression therapy.

Follow-up

A seven-day review in the author's clinic showed a small improvement and the patient was encouraged to self-manage until her referrals were actioned.

On 2 October 2023, the GP prescribed a three-month course of erythromycin. Dapsone was rejected due to its immunosuppressant properties. Compression continued to prove challenging for the patient, due to discomfort.

The dermatologist reviewed the patient on 15 November 2023 and prescribed hydrocortisone cream, but the patient discontinued it due to her own fears of skin thinning.

March 2024 update

The erythromycin course was completed in January 2024. Compliance with the ribbed garment and cutaneous improvements meant that the foot was shapely, oedema had subsided, and the patient was able to wear shoes again.

Discussion

This case demonstrates the importance of uncovering the correct diagnosis so that the underlying cause of symptoms can be addressed. The patient was convinced of 'sun damage' from her follow-up with the dermatologist, and was subsequently treated by healthcare professionals on her mistaken assertion rather than by

Figure 2.
Initial presentation at the author's clinic.

accessing the biopsy report from the dermatologist, who had diagnosed AAD in February 2023. When permission was sought to share her case and photographs, the patient was informed by the author about the pertinent use of propranolol for AAD. A follow-up dermatology appointment was suggested by the author for a medication review, as she reported new, 'inky blotches' on the other leg when being advised about propranolol. The case is ongoing.

ACROANGIODERMATITIS (AAD)

AAD is a rare, benign, vascular phenomenon characterised by reactive malformations or angiodysplasia (abnormal, dilated, tortuous proliferation) of cutaneous blood vessels. It usually presents bilaterally, on the extensor surfaces of the lower limbs and feet with oedema, violaceous (red/purple) and brown/black papules, macules or nodules, haemosiderin staining and indurated (hardened) plaques. The lesions often ulcerate, bleed and weep, which increases the risk of infection. It is more prevalent in males (Mehta et al, 2010; Singh and Manchanda, 2014).

ZIPZOC◇

Zinc Oxide Medicated Stocking

For skin. For wounds. For you.

ZIPZOC medicated stocking is impregnated with 20% Zinc Oxide which helps to correct a local zinc deficit [1] in skin which is damaged by wounds or dermatological conditions.

The preservative free formula of ZIPZOC means there may be a reduced risk of reaction for those with sensitive skin. ZIPZOC promotes self-care for individuals living with a wound or skin condition as it's simple application method means that dressing changes can easily fit around your lifestyle.

- **Quick and easy to apply**
- **Soothing & comfortable**
- **Preservative free formula**
- **Low adherent**
- **Up to 7 days wear time**
- **Promotes patient self-care**

ZIPZOC◇

Watch our instruction video here

pastebandagesevolan.com

Ordering Information

NHS Catalogue	Code
Zipzoc Stocking	EFA 029

FP10 Drug Tarrif	PIP Code
Zipzoc Stocking (4's)	234-3739
Zipzoc Stocking (10's)	234-3747

EVOLAN.

Evolan Pharma AB
E: pastebandages@evolan.se
T: +44 07554133321

1. Agren M (1990) Studies on Zinc in Wound Healing. Linkoping University Medical Dissertations No. 320. Department of Pathology II, Faculty of Health Science. Linkoping, Sweden.

ZIPZOC (zinc impregnated medicated stocking) **Abbreviated prescribing information**. Refer to summary of product characteristics before prescribing. **Composition**: A sterile rayon stocking impregnated with an ointment containing 20% Zinc Oxide. Each stocking (80cm x 7cm) contains about 41.5g of ointment. **Therapeutic indications:** Aid to the treatment of chronic leg ulcers and other associated skin conditions. Where chronic venous insufficiency exists, the medicated stocking can be used as a primary contact layer under compression bandaging or hosiery. **Method of Administration:** Because ZIPZOC is preservative free, it must be changed no less frequently than weekly. For topical application, ZIPZOC should be applied to cover the lower leg from the base of the toes to below the knee. All folds should be smoothed out. To protect clothing, a suitable outer bandage should be worn. If chronic venous insufficiency exists, ZIPZOC may be used as a primary contact layer under compression therapy and may be left in situ for one week, before re-application. **Contra-indications:** Arterial leg ulcers. Known hypersensitivity to zinc oxide or the excipients in the ointment. **Special Warnings and Special Precautions:** None known. **Interactions:** None known. **Pregnancy and Lactation:** There is no evidence to suggest ZIPZOC should not be used during pregnancy. **Undesirable Effects:** The skin of leg ulcer patients is easily sensitised to some topical medications. ZIPZOC contains no preservatives thereby reducing the risk of skin reactions. Reported reactions include, rash, erythema, itching and maceration of the wound edge. If the outer bandage is inappropriate or the medicated stocking is not changed with sufficient frequency it can cause the stocking to dry out. **Excipients:** Liquid Paraffin Ph. Eur. White Soft Paraffin BP. **Incompatibilities:** None reported. **Shelf Life:** 3 years. **Storage:** At or below 30°C. Keep all medicines out of the reach of children. **Packaging:** Polyethylene aluminium foil laminated pouches, each pouch containing a single medicated stocking. The outer carton will contain either 4 or 10 pouches. **Legal Category:** P **Market authorization number:** PL44616/0002 **Date of first authorisation/renewal of the authorisation:** 01 October 2006 **Date of revision of text:** 26 October 2018 Trade Mark of Evolan Pharma AB **Date of preparation:** October 2018

Figure 3.
Seven-week improvement after first being seen in the author's clinic — skin plaque completely resolved.

There are two variants of AAD (Mine et al, 2021):

- Mali type, first described in 1965 (Mali et al, 1965), which is associated with venous hypertension as a complication of severe, chronic venous insufficiency/stasis
- Stuart-Bluefarb syndrome, named in 1967 (Bluefarb and Adams, 1967; Stewart, 1967), which is associated with high venous pressure due to congenital arteriovenous malformation, iatrogenically acquired arteriovenous fistulae from haemodialysis shunts in chronic renal failure in both legs and arms (Fernandez et al, 2007; Ishikawa et al, 2018), or from trauma, such as varicose vein removal (Mine et al, 2021).

Differentiating the congenital malformations of Stuart-Bluefarb syndrome from AAD of Mali is important, as prognosis of the former is more severe. Morbidity and mortality are dependent on the underlying cause (Sharma et al, 2019).

AAD can also occur on the stumps of lower limb amputees, due to poorly fitting suction prostheses (Sbano et al, 2005), and in patients with paralysis, as chronic venous insufficiency, lack of calf and foot muscle pumps and disturbed innervation of the blood vessels, lead to elevated capillary pressure (Landthaler et al, 1988).

AAD is graded according to its clinical features (*Table 1*).

KAPOSI'S SARCOMA (KS)

KS is a rare cancer, always caused by infection with the human herpes virus 8 (HHV8), in the presence of immunodeficiency; often caused by the human immunodeficiency virus (HIV) or immunosuppressant drugs (Grabar and Costagliola, 2021). Although the occurrence of KS has reduced dramatically over the past 25 years for those living with HIV or AIDS, due to potent antiretroviral therapy, KS is still one of the most prevalent cancers in this demographic, especially in homosexual or bisexual men and in sub-Saharan Africa, where it remains endemic. Even for those with completely restored immunity, with an undetectable viral load due to drug regimens, the risk of KS is still 30 times higher than in the general population (Grabar and Costagliola, 2021).

AAD versus KS

Unlike KS, where the vascular proliferation is independent of the existing vessels, AAD is a hyperplasia of pre-existing vasculature. Some authors classify AAD as a vascular lesion, while others define it as a variant of stasis dermatitis, belonging in the group of eczematous diseases (Coban et al, 2015). Lesions occur predominantly on the lower legs, but can extend down to the dorsum, and plantar surfaces of the feet and toes and up the leg over the path of dilated veins. Individual lesions can begin as tiny, purple spots (macules), that join together to form itchy, irregular sized plaques, which can be many centimetres in diameter. The skin can become eczematous. The colour can vary from red to purple, brown or yellow depending on the amount of haemosiderin staining. The lesions can then indurate to form thick, yellowing plaques (Varyani et al, 2011; Mine et al, 2021).

Histological differences

In AAD, there is an expansion of the whole capillary bed throughout the dermis. Capillaries are dilated with thick walls, presenting an appearance that the tumour is composed of blood or lymph vessels (angiomatous) (Coban et al, 2015). In the interstitial (perivascular) spaces, there is slight proliferation of endothelial cells with a lobular structure, with extravasation of red blood cells, causing haemosiderin deposition. Mild fibroblastic proliferation shows fibrosis of the dermis and a superficial infiltrate containing eosinophils, lymphocytes and histocytes is also observed (Rongioletti and Rebora, 2003; de Miguel et al, 2014).

There are two important histological differences between AAD and KS. The first is the absence of HHV-8 expression in AAD. The second, most important differential, is the staining pattern of the CD34 antigen. CD34 are haematopoietic stem and progenitor cells, which are rare precursor cells that have the capacity for self-renewal and multilineage differentiation (Schulz et al, 2009). In AAD, only the endothelial cell linings of the

Practice point

While both AAD and KS present with similar angioprolific lesions, it is important to understand the differences in pathophysiology, and the significance of the patient groups who are likely to present. Histological biopsies should be undertaken to differentiate the two, and KS should be ruled out for any patients who are HIV positive, or with compromised immune systems.

Table 1: AAD grading according to clinical features (de Miguel, 2014)

Grading	Description
Stage 1	Erythema with violaceous macules and plaques are present, but asymptomatic
Stage 2	Expanding lesions, which pulsate
Stage 3	Skin changes with destructive changes such as ulceration, bleeding and pain, with the possibility of necrosis and lytic bone changes
Stage 4	Decompensated heart failure

capillaries are plump and CD34 antigen positive, while in KS, both endothelial cells and perivascular, neoplastic spindle cells, which are specific to KS, stain positive (Weedon, 2010; Kanitakis et al, 1996).

Table 2 shows a number of other differences.

AETIOLOGY AND PATHOGENESIS OF AAD

While the exact aetiology remains unclear, elevated venous pressure with venous and lymphatic stasis induce chronic hypoxia, which cause fibroblast production and the formation of new blood vessels from existing ones (neovascularisation) (Kanitakis et al, 1996), which are assisted by angiogenic factors like prostaglandin E1 (PGE1) or heparin-like factor (Samad and Dodds, 2002; Elder et al, 2005). The abnormally developed arteriovenous malformations in AAD cause cutaneous ischaemia and are expansive (Kofoed et al, 1985). The lack of oxygen, itself, promotes localised fibroblast and endothelial growth factors to produce endothelial and cutaneous changes (Virgili et al, 2003; Parsi et al, 2015).

TREATMENT OF AAD

Because of a paucity of literature on AAD, most of the treatment plans for the reported case studies are anecdotal. The underlying cause of the symptoms should be appropriately diagnosed and any congenital or acquired vascular disorders should be corrected, if possible. Management of symptoms is important to prevent further complications, such as soft tissue destruction, bone demineralisation, congestive heart failure and infection (Coban et al, 2015).

Treatment tends to be conservative. Compression stockings or intermittent pneumatic pumps, with wound care interventions for venous stasis and leg ulcer management, remain the mainstay of therapy. Surgical elimination of arteriovenous shunts is curative in AAD (Samad and Dodds, 2002; Coban et al, 2015). For arteriovenous malformations, embolisation, sclerotherapy or surgery can be utilised (Samad and Dodds, 2002), where multiple small fistulae can be destroyed individually, but this can lead to ischaemia and necrosis of tissues (Coban et al, 2015). Anticoagulants have resolved thrombophilic disease, where blood clots form too easily (Martin et al, 1999). Although these studies are old, they are reiterated in recent literature (Gaurav et al, 2024).

Table 2: Karposi sarcoma versus acroangiodermatitis (Coban et al, 2015)

Karposi sarcoma	Acroangiodermatitis
Human herpes virus 8 (HHV8) positive	Human herpes virus 8 (HHV8) negative
Promontory sign (protuberance) present	No promontory sign (protuberance)
Prominent jagged vessels	Tortuous venules
'Back-to-back' appearance of angiomatous capillaries	Angiomatous capillaries are separated by an oedematous matrix
New vascular formation	Proliferation of pre-existing vascular structure
Slit-like inconspicuous lumin	Narrow but more regular lumina forming nodular structures
CD 34 (-) negative perivascular fibroblastic proliferation	CD 34 (+) positive perivascular fibroblastic proliferation
Atypia in endothelial cells	No or minimal atypia in endothelial cells
Small hyaline globules may be present	No small hyaline globules
Plasma cells are present in perivascular inflammatory infiltrate	No plasma cells in perivascular inflammatory infiltrate

'Management of symptoms is important to prevent further complications, such as soft tissue destruction, bone demineralisation, congestive heart failure and infection.'

REPORTED CASES OF AAD

The following studies would be difficult to collate for a systematic review, due to the heterogeneity between patients and treatments. However, they offer options which have delivered results and improved the quality of patients' lives in most cases.

From Saudi Arabia, Alshihry et al (2014) reported that AAD was worsened by the removal of veins. In this case, the leg vein was harvested for coronary heart bypass grafting, rather than phlebectomy by ligation and stripping from a 68-year-old, obese woman with type 2 diabetes mellitis, nephropathy and other comorbidities. The existing lesions on both lower limbs worsened after surgery, but the patient, unlike the case presented above, was obese rather than slim, non-compliant for compression therapy, and erythromysin was not effective.

Mehta et al (2010) presented two cases from Mumbai, India. The first also resulted from varicose vein removal. A 41-year-old, healthy male farmer presented with a four-year history of two raised lesions on the dorsum of the left foot, which had been bleeding and ulcerating around the ankle for the past two years. He had received vein stripping and sclerotherapy for varicose veins in both lower limbs two years before presentation of any symptoms. AAD was confirmed through biopsy. Venous doppler revealed multiple varicosities along the path of the great saphenous vein, with four incompetent perforators. Oral erythromycin, topical clobetasol propionate (0.05%) cream, oral calcium dobesilate, 500mg twice daily, and emollients were prescribed for three weeks, with recommended leg compression and elevation. Following a review, calcium dobesilate and compression therapy were continued. The ulcers healed with hyperpigmentation in two months, but the nodular lesions persisted.

The second case involved a 26-year-old man who presented after four years with oedema of the left

Practice point

Erythromycin is an antibiotic used to treat bacterial infections, including skin conditions like acne and rosacea. For AAD, erythromycin appears to have an anti-inflammatory effect and has been shown to inhibit the chemotaxis of leukocytes, monocytes and eosinophils (Esterly, et al, 1978).

ankle and a large, single ulcerated plaque, which was discharging pus and had a history of recurrent bleeding. The skin surrounding the ulcer showed dilated tortuous veins. Venous doppler revealed a dilated, left popliteal vein. He was treated with oral doxycycline, oral metronidazole, topical clobetasol propionate (0.05%) cream, oral calcium dobesilate 500mg twice daily, and emollients initially for fifteen days, with leg elevation and compression. Antibiotics were discontinued after 15 days, as per the stated protocol. Calcium dobesilate and compression were continued. The ulcer healed completely with scarring and hyperpigmentation over the next four months.

In the United Kingdom, Samad and Dodds (2002) described a 60-year-old man with a 20-year history of venous disease and recurrent bilateral leg ulcers. He had undergone surgery for bilateral varicose veins and worn class 2 compression stockings for many years. Following numerous venous ligations for non-healing ulcers, a new ulcer developed on his left index toe, which was biopsied and AAD was confirmed. It did not heal within three months and an identical lesion appeared on the right index toe. The ulcers were non-responsive to topical antibiotics and wound care, so erythromycin 500mg four times a day, for three months, was prescribed, after which there was significant improvement.

In 1995, Rashkovski et al from Israel described a 65-year-old female, hospital inpatient, with chronic venous insufficiency, painful AAD and a history of Weber-Christian panniculitis (inflammation of the subcutaneous fat layer of the skin), affecting her breasts, axillae, abdomen and back, which was still partially active despite aggressive long-term therapy. Initial leg elevation and debridement were unsuccessful, so 50mg dapsone was administered twice daily. A swift improvement was seen after three weeks, when she was discharged with compression hosiery and continued medication. Within three months the ulcers and lesions had completely resolved.

Singh and Manchanda (2014) presented the case of a 45-year-old previously healthy female who had suffered with pitting oedema, pain and recurring ulcers in both feet for eight years. There was no evidence of varicose veins and her ABPI measurement was normal. The patient was prescribed topical corticosteroids and oral dapsone, 100mg daily, and at six-week follow-up there was a resolution of existing lesions with persisting hyperpigmentation and atrophic scars.

Mine et al (2021) reported the case of a 57-year-old Japanese man who first presented following four years of painful plantar erythema on both feet. He was treated with topical steroids and systemic dapsone, which were withdrawn after two months as symptoms had improved. Ten years later he returned following a flare, which was not helped by the reinstituted drugs — 5mg of prednisone daily, failed to improve symptoms. Compression therapy mildly improved symptoms, but after six months AAD of Mali was diagnosed via biopsy. Propranolol 30mg daily was initiated and increased to twice daily two months later. The erythematous plaques improved and disappeared leaving only pigmented skin. After two years no symptoms had recurred and, as he suffered no side-effects from propranolol, he continued to take it to control hypertension.

CONCLUSION

AAD is a rare, benign condition, which is under-reported in the literature. It should be considered in cases of CVI, varicose vein removal, and those with congenital or iatrogenic arteriovenous malformations, who present with dermatitis-like symptoms and non-healing ulcers. It should be differentiated from KS by biopsy and histology, especially for patients who are homosexual, bisexual or HIV positive; as, even with an undetectable viral load, those with HIV have a 30% increased risk of KS, which is malignant. There is a great disparity of oral and topical treatments in the presented cases, including erythromycin, doxycyline, metronidazole, dapsone, propranolol and topical steroids, but the mainstay of AAD management is compression therapy for venous stasis and effective wound care. JCN

REFERENCES

Alshihry H, Chisti MA, Hamadah I (2014) Pseudo-Kaposi sarcoma worsening after leg vein harvest for coronary artery bypass grafting. *Ann Saudi Med* 34(2): 179–81

Bluefarb SM, Adams LA (1967) Arteriovenous malformation with angiodermatitis. Stasis dermatitis simulating Kaposi's disease. *Arch Dermatol* 96(2): 176–81

Coban I, Kokenek-Unal TD, Alper M (2015) Spontaneous acroangiodermatitis. *Indian J Dermatol* 60(3): 268–71

de Miguel R, López-Gutierrez JC, Boixeda P (2014) Arteriovenous malformations: a diagnostic and therapeutic challenge. *Actas Dermosifiliogr* 105: 347–58

Drolet BA, Frommelt PC, Chamlin SL, Haggstrom A, Bauman NM, Chiu YE, et al (2013) Initiation and use of propranolol

Practice point

Dapsone is a sulphone antibiotic used for treating various bacterial infections, autoimmune disorders and skin conditions. It has anti-inflammatory properties, which are similar to steroids. Dapsone was first used to treat leprosy in 1945. Serious, but rare side-effects include methemoglobinemia (a rare blood disorder which affects how red blood cells delivery oxygen throughout the body), low blood cell counts, and serious skin reactions (NICE, 2024).

Practice point

Propranolol (a beta blocker) is mainly used to treat high blood pressure, irregular heart rates, thyrotoxicosis, anxiety and essential tremors, but more recently it has been shown to be effective in treating vascular infantile haemangioma, and has become first-line treatment for these lesions (Drolet et al, 2013; Léauté-Labrèze et al, 2015) which, like KS, develop from the dysregulated proliferation of epithelial cells (Greenberger and Bischoff, 2013). Using this hypothesis, propranolol has been used to treat KS and been found to decrease proliferation of the herpes virus infected cells in the epithelium and induce lytic gene expression (which disrupts the specific viral replication process) (McAllister, et al, 2015). As propranolol is effective for vascular lesions, with or without HHV8 involvement, it is also indicated for AAD.

for infantile hemangioma: report of a consensus conference. *Pediatrics* 131: 128–40

Elder DE, Elenitsas R, Johnson BL, Murphy GF (2005) *Vascular tumors: tumors and tumor like conditions of blood vessels and lymphatics*. 9th edn. Lippincott Williams and Wilkins, USA

Esterly NB, Furey NL, Flanagan LE (1978) The effect of antimicrobial agents on leukocyte chemotaxis. *J Invest Dermatol* 70: 51–5

Fernández R, Verea MM, Martínez W, Yebra-Pimentel MT, Fonseca E (2007) Bilateral Pseudo-Kaposi sarcoma in upper limbs. *Actas Dermo-Sifiliograficas* 98(4): 268–70

Grabar S, Costagliola D (2021) Epidemiology of Kaposi's sarcoma. *Cancers* 13(22): 5692

Greenberger S, Bischoff J (2013) Pathogenesis of infantile haemangioma. *Br J Dermatol* 169: 12–19

Gaurav V, Agrawal S, Bhari N, Goyal A (2024) Stewart-Bluefarb syndrome: a rare presentation of acroangiodermatitis. *Indian Dermatology Online Journal:* 10.4103. Available online: https://journals.lww.com/idoj/fulltext/9900/stewart_bluefarb_syndrome__a_rare_presentation_of.289.aspx

Ishikawa T, Nishizawa A, Satoh T (2018) Acroangiodermatitis with pincer nail of the finger due to venous hypertension from hemodialysis arteriovenous shunt. *Eur J Dermatol* 28(2): 247–8

Kanitakis J, Narvaez D, Claudy A (1996) Expression of the CD34 antigen distinguishes Kaposi's sarcoma from Pseudo-Kaposi's sarcoma (acroangiodermatitis). *Br J Dermatol* 134(1): 44–6

Kofoed ML, Klemp P, Thestrup-Pedersen K (1985) The Klippel-Trenaunay syndrome with acro-angiodermatitis (pseudo-Kaposi's sarcoma). *Acta Derm Venereol* 65(1): 75–7

Landthaler M, Langehenke H, Holzmann H, Braun-Falco O (1988) Akroangiodermatitis Mali (Pseudo-Kaposi) an gelähmten Beinen [Mali's acroangiodermatitis (pseudo-Kaposi) in paralyzed legs]. *Hautarzt* 39(5): 304–7

Léauté-Labrèze C, Hoeger P, Mazereeuw-Hautier J, Guibaud L, Baselga E, Posiunas G, Phillips RJ, et al (2015) A randomized, controlled trial of oral propranolol in infantile hemangioma. *N Engl J Med* 372: 735–46

Mali JW, Kuiper JP, Hamers AA (1965) Acro-angiodermatitis of the foot. *Arch Dermatol* 92(5): 515–8

Martin L, MacHet L, Michalak S, et al (1999) Acroangiodermatitis in a carrier of the thrombophilic 20210A mutation in the prothrombin gene. *Br J Dermatol* 141(4): 752

McAllister SC, Hanson RS, Manion RD (2015) Propranolol decreases proliferation of endothelial cells transformed by Kaposi's sarcoma-associated herpesvirus and induces lytic viral gene expression. *J Virol* 89(21): 11144–9

Mehta AA, Pereira RR, Nayak CS, Dhurat RS (2010) Acroangiodermatitis of Mali: a rare vascular phenomenon. *Indian Venereol Leprol* 76: 553–6

Mine T, Koike Y, Ehara D, Murota H (2021) A case of bilateral plantar pseudo-Kaposi sarcoma successfully treated with propranolol. *JAAD Case Rep* 18: 74–8

National Institute for Health and Care Excellence (2024) *Dapsone*. Available online: https://bnf.nice.org.uk/drugs/dapsone/ (accessed 15 October, 2024)

Parsi K, O'Connor AA, Bester L (2015) Stewart-Bluefarb syndrome: Report of five cases and a review of literature. *Phlebology* 30: 505–14

Pittaluga P, Chastanet S (2012) Lymphatic complications after varicose veins surgery: risk factors and how to avoid them. *Phlebology* 27(1 suppl): 139–42

Rashkovsky I, Gilead L, Schamroth J, Leibovici V (1995) Acro-angiodermatitis: review of the literature and report of a case. *Acta Derm Venereol* 75(6): 475–8

Rongioletti F, Rebora A (2003) Cutaneous reactive angiomatoses: patterns and classification of reactive vascular proliferation. *J Am Acad Dermatol* 49(5): 887–96

Rudström H, Björck M, Bergqvist D (2007) Iatrogenic vascular injuries in varicose vein surgery: a systematic review. *World J Surg* 31(1): 228–33

Samad A, Dodds S (2002) Acroangio-dermatitis: review of the literature and report of a case associated with symmetrical foot ulcers. *Eur J Vasc Endovasc Surg* 24(6): 558–60

Sbano P, Miracco C, Risulo M, Fimiani M (2005) Acroangiodermatitis (pseudo-Kaposi sarcoma) associated with verrucous hyperplasia induced by suction-socket lower limb prosthesis. *J Cutan Pathol* 32(6): 429–32

Schulz C, von Andrian UH, Massberg S (2009) Hematopoietic stem and progenitor cells: their mobilization and homing to bone marrow and peripheral tissue. *Immunol Res* 44(1–3): 160–8

Sharma R, Gupta M, Thakur S, Gupta A (2019) Parkes Weber syndrome presenting as Stewart-Bluefarb acroangiodermatitis. *BMJ Case Rep* 12(3): e227793

Singh SK, Manchanda K (2014) Acroangiodermatitis (Pseudo-Kaposi sarcoma). *Indian Dermatol Online J* 5(3): 323–5

Stewart WM (1967) Fausse Angiosarcomatose de Kaposi par fistules arteriovenulaire multiples. *Bull Soc Fr Dermatolsyphil* 74: 664–5

Varyani N, Thukral A, Kumar N, Gupta KK, Tandon R, Tripathi K (2011) Nonhealing ulcer: acroangiodermatitis of mali. *Case Rep Dermatol Med* 2011: 909383

Virgili A, Trincone S, Zampino MP, Corazza M (2003) Acroangiodermatitis of amputation stump. *Eur J Dermatol* 13: 402–3

Weedon D (2010) *Vascular Tumours Skin Pathology*. 3rd edn. Churchill Livingstone/Elsevier: 910

Managing the challenges of cavity wounds in practice

Kirsty Mahoney

Cavity wounds present unique challenges in both assessment and management due to their complex anatomy and potential for complications such as tunnelling, undermining, and infection. Accurate documentation and thorough evaluation are critical for monitoring wound progression and guiding appropriate interventions. This article explores best practices for assessing and managing cavity wounds. Strategies for managing these wounds are discussed, emphasising the importance of maintaining a moist wound environment, preventing infection, and promoting granulation tissue formation. Multidisciplinary approaches, evidence-based techniques, and patient-centred care are highlighted as essential components in achieving optimal outcomes for patients with cavity wounds.

KEYWORDS:
■ Cavity wounds ■ Assessment ■ Dressing selection
■ Sorbsan® calcium-alginate wound dressing range

There is currently no universally accepted definition of what constitutes a cavity wound (Tickle, 2019; Timmons and Johnstone, 2022). The absence of standardisation stems from the diverse nature of cavity wounds, which can arise from various aetiologies, occur in multiple body locations, and vary significantly in size and depth (Timmons and Johnstone, 2022). Chaloner and Poole (1995) suggested that wounds exceeding 2cm in depth could be classified as cavity wounds. Williams (1997) expanded on this by describing cavity wounds as those that cannot be effectively managed with simple flat dressings and require a wound filler. Additionally, these wounds extend beyond the dermis, reaching into subcutaneous tissue, fascia, muscle, or even bone (Williams, 1997). However, the severity of a cavity wound can vary based on its location (Timmons and Johnstone, 2022). For instance, areas with minimal adipose tissue, such as the sacrum or malleolus, may result in a 2cm wound extending to muscle or bone. In contrast, a 2cm wound in an area with more adipose tissue, such as the buttocks, may not extend to the muscle or bone (European Pressure Ulcer Advisory Panel/National Pressure Injury Advisory Panel/Pan Pacific Pressure Injury Alliance [EPUAP/NPIAP/PPPIA], 2019; Timmons and Johnstone 2022).

'Cavity wounds encompass a varied range of wound aetiologies and can be present in both acute and chronic wounds.'

DIFFERENT TYPES OF CAVITY WOUNDS

Cavity wounds encompass a varied range of wound aetiologies and can be present in both acute and chronic wounds (Timmons and Johnstone, 2022). The most common wounds that may progress into a cavity wound include pressure ulcers, diabetic foot wounds, dehisced surgical wounds, malignant wounds, traumatic wounds and abscesses following drainage (Tickle, 2019; Timmons and Johnstone, 2022). This list is not exhaustive and establishing and treating the underlying cause of the wound where possible is essential to facilitate healing.

PREVALENCE OF CAVITY WOUNDS

Determining the prevalence of cavity wounds is challenging due to limited specific data and lack of a universal definition of a cavity wound (Vowden, 2016; Tickle, 2019). However, insights can be drawn from broader prevalence studies that encompass wound aetiologies often associated with cavity formation, such as dehisced surgical wounds, category 3 and 4 pressure ulcers, and abscesses. In a study conducted across 18 NHS trusts in England, the prevalence of category 3 and 4 pressure ulcers was 11.1% and 4.6% respectively (Stephenson et al, 2021). Additionally, a survey by Chetter et al (2017) reported a prevalence of surgical wounds healing by secondary intention at 0.41 per 1,000 population. A prevalence study that included specific wound aetiologies by Guest et al (2018) noted that abscesses accounted for 7% of the surveyed population. While these figures provide a general estimate of cavity wound prevalence, the actual occurrence is likely to be much higher

Kirsty Mahoney, clinical manager, Wound Care People Ltd

as there are no recent prevalence studies that are specific to cavity wounds (Vowden, 2016).

CHALLENGES OF CAVITY WOUNDS

Cavity wounds pose several challenges for both clinicians and patients (Timmons and Johnstone, 2022). These challenges include the risk of infection (*Figure 1*) and biofilm formation, excessive exudate production, and damage to the periwound skin (often resulting from uncontrolled exudate). For clinicians, additional issues such as undermining and tunnelling can further hinder wound healing, obscure the wound bed, and make accurate measurement and assessment more difficult (Vowden, 2016). Furthermore, the anatomical location of the wound can complicate dressing application (Timmons and Johnstone, 2022).

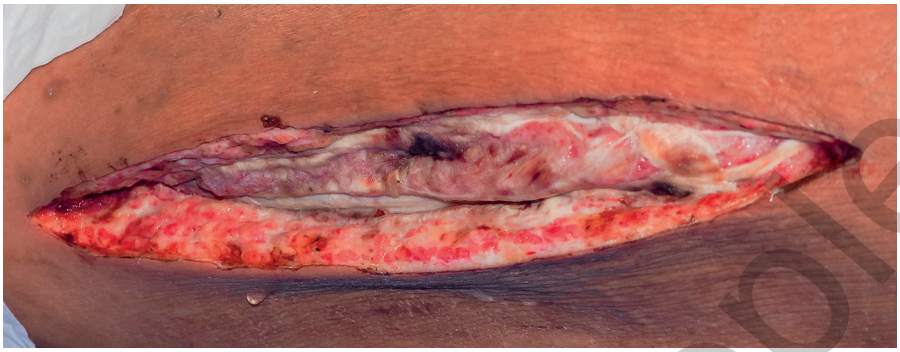


Figure 1.
Infected dehisced surgical wound.

From the patient's perspective, living with a cavity wound can significantly impact their quality of life. Patients may experience pain, discomfort, leakage, malodour, and clothing soiling caused by excessive exudate, leading to embarrassment and an increased need for dressing changes (World Union of Wound Healing Societies [WUWHS], 2019). These factors should always be considered during holistic assessment (Tickle, 2019). Management strategies should be individually tailored to address both the patient's concerns and the specific requirements of the wound (Tickle, 2019).

Table 1: Principles of comprehensive wound assessment (adapted from Scott-Thomas et al, 2017; Grey and Patel, 2022)

General patient details
▸ Comorbidities — consider morbidities that may contribute to poor healing, e.g. diabetes, peripheral arterial disease (PAD)
▸ Medication — medications can contribute to poor healing, e.g. steroids, immunosuppressants
▸ Mobility
▸ Allergies
▸ Nutrition and hydration, e.g. identification of obesity or malnutrition, which can contribute to poor healing
▸ Smoking — reducing body's ability to deliver oxygen and nutrients to the wound
▸ Age — ageing slows down the body's ability to repair itself
Wound-related factors
▸ How wound occurred
▸ Duration of wound
▸ Previous history of a similar wound
Characteristics of the wound
▸ Location of wound
▸ Wound measurements, including width, length, depth and undermining
▸ Exudate — volume, type, colour, viscosity and how dressing is managing
▸ Tissue within the wound bed, e.g. granulating, sloughy, necrotic, overgranulating
▸ Presence of infection or biofilm — erythema, inflammation, local warmth, odour, increased exudate, delayed healing, increased pain
▸ Pain, e.g. type of pain, when pain occurs, what relieves pain
▸ Odour
▸ Condition of the wound edge, e.g. punched out, macerated epithelialisation, rolled, raised
Surrounding skin
▸ Common issues with surrounding skin, e.g. maceration, cellulitis, eczema, hyperkeratosis, callous, dry skin
Patient perspective
▸ Understanding what is important to the patient
▸ Social circumstances that may impact on the patient or wound's ability to heal
▸ Does the patient have an adequate knowledge and understanding of their wound and underlying comorbidities
▸ Patients' willingness to participate in managing the wound and engaging with HCPs (co-production)

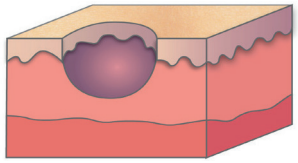
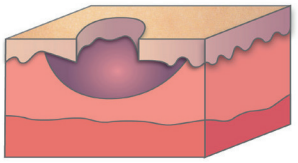
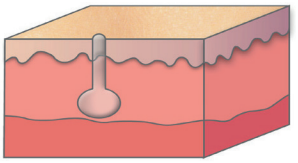
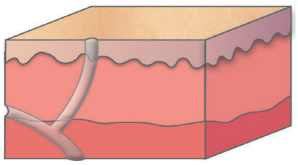
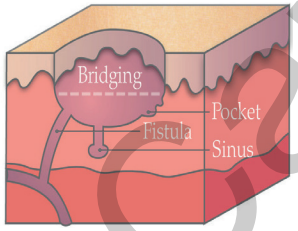
ASSESSMENT OF CAVITY WOUNDS

The underlying principles of assessing and treating a cavity wound remain the same as for any acute or chronic wound (Vowden, 2016). Conducting a comprehensive patient assessment (*Table 1*) enables healthcare professionals to formulate an accurate diagnosis, identify and address barriers that may hinder healing, and develop the most appropriate plan of care to promote effective wound healing (Mahoney, 2020).

Accurate documentation is crucial for monitoring the progression or deterioration of any wound (Vowden, 2016). For regular shaped cavities (*Table 2*), wound measurements such as length, width and depth can be easily recorded using a disposable paper ruler (Tickle, 2019). Digital solutions, including digital photography and 3D technologies, are available to enhance measurement accuracy by determining the wound's area and volume (Vowden, 2016). However, significant challenges arise in obtaining accurate measurements

when tunnelling, undermining, or tracking are present (*Table 2*) (Tickle, 2019). In such cases, using a sterile plastic probe to determine the wound's depth and documenting the location of tunnelling or undermining can assist in obtaining measurements. This can be done by marking the position on a drawn image or using a clock face as a reference, with 12 o'clock representing the position of the patient's head, to indicate where undermining is present in relation to this (*Figure 2*) (Mahoney, 2020). Care should be taken when probing a wound to avoid damage to underlying structures, such as blood vessels, internal organs or internal sutures (if present). As with any wound, regular reassessment of its progress should be undertaken and documented (Vowden, 2016).

Table 2: Examples of cavities (adapted from Tickle, 2019; Vowden, 2016; Wounds UK, 2018)

	Regular-shaped cavity
	Cavity with undermining — the dimensions extend beyond the boundaries of the epidermal opening
	Sinus — a tract that is blind-ended and extends from the underlying cavity to the skin surface
	Fistula — abnormal opening that connects either two organs or an organ to the skin's surface
	Cavity with bridging — occurs when partial healing takes place over a cavity wound, resulting in a bridge of tissue

MANAGEMENT

Cavity wounds heal by secondary intention, i.e. fill with granulation tissue from the bottom up then contracting with epithelial cells around the edge of the wound (Tickle, 2019). They are associated with complex complications and often require a multidisciplinary approach to management with healthcare professionals who have specialist knowledge and skills, e.g. surgical team, dieticians, tissue viability nurses, diabetic specialist team — this list is not exhaustive and will depend on the aetiology of the wound and presenting management challenges (Tickle, 2019).

General principles of wound management should be applied to a cavity wound and include accurately diagnosing and treating the underlying cause and instigating a management plan that optimises healing, reduces the risk of complications and incorporates the patient's perspectives (Vowden, 2016).

Important management principles include:

- Identifying and correcting factors that may impede wound healing
- Cleaning wound to remove debris, pus and dressing residue
- Removing non-viable tissue (slough and necrosis)
- Managing exudate
- Reducing bioburden and managing infection should it occur
- Protecting periwound skin
- Selecting a dressing that addresses the wound environment.
- Involving patients in the planning process

(Tickle, 2019).

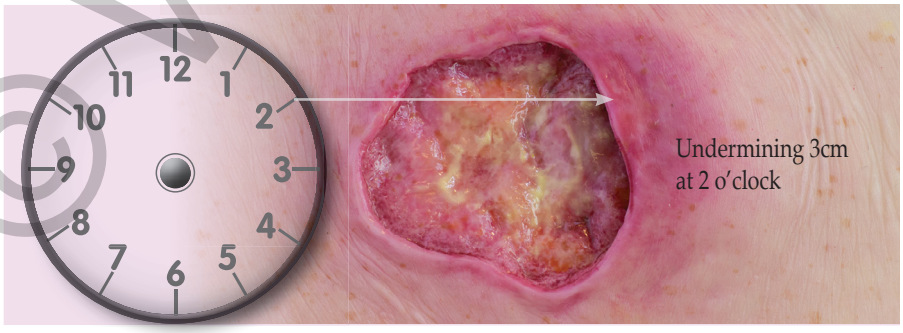


Figure 2.
Using a clock face to identify the positioning of undermining.

DRESSING SELECTION

Most cavity wounds will require a wound filler/packing followed by a secondary dressing that is capable of absorbing exudate (Timmons and Johnstone, 2022). The primary dressing should be able to effectively wick exudate away from the wound bed into a secondary dressing that is capable of managing the exudate efficiently (Timmons and Johnstone, 2022). With many wound dressings available on the market, dressing selection can be challenging. However, properties that are important to consider when treating a cavity wound include:

- Ability to create close contact with the wound bed to avoid dead space and pooling of exudate which can contribute to infection

Creed Health
INNOVATE.SUPPORT.HEAL.

The trusted solution for cavity wounds for over 35 years.

The same great product now with a new distributor.

Probe to help you assess the wound.

Probes can also be ordered separately via NHSSC and DT.*

Scan the QR code to learn more about Sorbsan and gain CPD time

Size	Product code	PIP code	NHSSC code	Qty
Flat 5x5cm	1400	019-0579	ELS866	10
Flat 10x10cm	1410	034-8839	ELS861	10
Flat 10x20cm	1415	019-0975	ELS865	5
Packing 30cm/2g	1411	034-8979	ELS862	5
Ribbon 40cm/1g	1412	003-5215	ELS863	5
Probe 125 mm	1425	416-0222	ELZ1229	5

Find out more at www.creedhealth.co.uk
+44 (0) 1623 391578
sales@creedhealth.co.uk
Unit 2, Hamilton Court, Oakham Business Park
Mansfield, Notts. NG18 5FB, UK

*A probe is supplied with Sorbsan Packing and Ribbon for customers via the Drug Tariff. It is also available separately through the Drug Tariff and NHSSC.

- Being able to facilitate autolytic debridement
- Managing bioburden
- Effectively controlling exudate and preventing leakage
- Allowing free drainage and effectively wicking exudate into secondary dressing
- Pain-free dressing removal
- Being non-adherent
- Not leaving fibres within the wound

(Vowden, 2016; Tickle, 2019; Timmons and Johnstone, 2022).

In clinical practice, alginates are often used to pack cavity wounds due to their unique properties. Alginate dressings are derived from brown seaweed (Cowen, 2023). When alginate fibers come into contact with exudate they release calcium ions, which are exchanged for sodium ions present in the exudate, resulting in the formation of a hydrophilic gel. Alginate dressings are highly absorbent and are capable of absorbing 15–20 times their own weight in exudate and are therefore suitable for wounds producing a medium-to-high volume of exudate, in particular cavity wounds (Thomas, 1992). Additionally, due to their composition, alginates promote autolytic debridement, have haemostatic properties, and are biodegradable and non-toxic (Thomas, 1992) — making them an effective dressing to manage cavity wounds. An example of a calcium-alginate dressing range is Sorbsan® (Creed Health).

SORBSAN®

Sorbsan is a sterile, non-woven, natural calcium alginate wound dressing derived from seaweed. It is high in mannuronic acid and low in guluronic acid.

How it works

Sorbsan calcium-alginate wound dressings contain high levels of mannuronic acid, resulting in a rapid gelling rate upon contact with exudate. Furthermore, the resulting formation of an amorphous gel on contact with wound exudate ensures contact with the wound bed. In infected and cavity wounds, this property reduces the risk of untreated gaps, which could otherwise delay healing (Thomas, 1992). The amorphous gel that is formed additionally maintains a moist wound environment, promotes epidermal regeneration (Barbu et al, 2021), is gentle on the wound and provides additional comfort to the wound bed.

'Alginate dressings are highly absorbent and are capable of absorbing 15–20 times their own weight in exudate and are therefore suitable for wounds producing a medium-to-high volume of exudate, in particular cavity wounds.'

Importantly, the gelled fibres disperse easily when irrigated with 0.9% saline, allowing for pain-free removal and minimising the risk of fibre retention in the wound bed (Dawson et al, 1992; Allymamod and Chamanga, 2011; Clark, 2012). Sorbsan dressings are suitable for a wide range of wounds, particularly those with slough and a high exudate volume.

For infected cavity wounds or reduction in bioburden of a cavity wound, Sorbsan® Silver has all the properties of Sorbsan with added 1.5% silver. These dressings have been demonstrated to have broad-spectrum antimicrobial properties effective against *Meticillin-resistant Staphylococcus aureus* (MRSA), *Vancomycin-resistant Enterococcus* (VRE) and *Meticillin-resistant Staphylococcus epidermidis* (MRSE) (Hampton, 2012; Hedger, 2012). Following application of Sorbsan Silver dressings, the wound should be assessed bi-weekly for signs of infection resolution. The product should be discontinued once infection has resolved, or the treatment regimen should be re-evaluated if infection persists (International Wound Infection Institute [IWII], 2022).

Sorbsan dressings are available as a flat wound dressing or as a packing or ribbon. Different sizes of the dressing are also available. For deep cavity wounds, Sorbsan® Packing and Ribbon dressings are usually the most convenient variation of the product available.

Sorbsan Packing and Ribbon dressings are additionally supplied with a probe via the Drug Tariff for convenient application and can be used to assist in wound measurement. Both the probe and dressings are also available separately through the Drug Tariff and NHS supply chain.

Sorbsan Packing is suitable for the management of larger, wet cavity wounds and Sorbsan Ribbon for smaller wet cavities, such as abscesses and sinuses resulting from:

- Pilonidal sinuses
- Pressure ulcers
- Postoperative wounds
- Fungating lesions.

Sorbsan Packing is also suitable for the management of bleeding cavity wounds:

- Following toe-nail avulsions
- Pressure ulcers
- Donor and graft sites
- Traumatic wounds.

Practice point: dressing application

- Wounds should be loosely filled with the packing agent as over packing can be detrimental to wound healing by preventing wound drainage and restricting local blood flow
- Number of dressings inserted into the wound should be recorded after dressing change and on removal to ensure that no dressings are left *in situ*
- Dressing remnants should be irrigated gently out of the wound cavity
- Always ensure that surrounding skin is protected from exudate leakage with an appropriate skin barrier
- Secondary dressing selected should have the ability to manage excess exudate.

CONCLUSION

Cavity wounds pose significant clinical challenges and often necessitate a multidisciplinary approach for effective management. Thorough assessment, addressing underlying causes of the wound and any barriers to healing, are essential. Selecting an appropriate dressing regimen to maintain an optimal wound environment, combined with active patient involvement, ensures that treatment strategies are tailored to maximise the wound's healing potential.

Sorbsan is a versatile, natural calcium-alginate dressing range designed to address a wide variety of wound care needs. Its rapid gelling reduces the risk of untreated gaps, particularly in infected and cavity wounds, while also maintaining a moist environment conducive to epidermal regeneration and wound healing. Additionally, Sorbsan dressings are gentle on the wound and allow for pain-free removal due to the easy dispersion of gelled fibers during irrigation. In the author's clinical opinion, Sorbsan is a reliable choice for healthcare professionals seeking effective, patient-centred wound care solutions to manage the challenges of cavity wound. JCN

REFERENCES

Allymamod A, Chamanga E (2011) *Use of calcium alginate vs hydrofibre dressing in City and Hackney Community Health Service*. Poster presentation, EWMA, 2011

Barbu A, Neamtu B, Zahan M, et al (2021) Current trends in advanced alginate-based wound dressings for chronic wounds. *J Pers Med* 11(9): 890

Chaloner D, Poole M (1995) Cavity wound management in the community. *Br J Nurs* 4(10): 556–61

Chetter I, Oswald AV, Fletcher M, Dumville JC, Cullum NA (2016) A survey of patients with surgical wounds healing by secondary intention; an assessment of prevalence, aetiology, duration and management. *J Tissue Viability* 26(2): 103–7

Clark M (2012) Technology update: rediscovering alginate dressings. *Wounds Int* 3(1): 1–4

Cowen T, ed (2023) *Wound Care Handbook 2023–2024*. 16th edn. MA Healthcare, London

Dawson C, Armstrong MW, Fulford SC, Faruqi RM, Galland RB (1992) Use of calcium alginate to pack abscess cavities: a controlled clinical trial. *J R Coll Surg Edinb* 37(3): 177–9

European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, Pan Pacific Pressure Injury Alliance (2019) *Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guidance. The International Guideline*. Emily Haesler, ed

Grey J, Patel G (2022) Wound Assessment. In: Price A, Grey J, Patel G, Harding K, eds. *ABC of Wound Healing*. Wiley and Sons Ltd, Oxford: 1–8

Guest JF, Fuller GW, Vowden P (2018) Costs and outcomes in evaluating management of unhealed surgical wounds in the community in clinical practice in the UK: a cohort study. *BMJ Open* 8(12): e022591

Hampton S (2012) *A clinical evaluation of Sorbsan Silver in wounds colonised with Pseudomonas aureus*. Poster presentation, EWMA, 2012

Hedger C (2012) *Can patients who are enrolled into a multicentre study demonstrate improved clinical outcomes and cost efficiency savings?* Poster presentation, Wounds UK, Harrogate, 2012

International Wound Infection Institute (2022) *Wound Infection in Clinical Practice*. Wounds International, London

Mahoney K (2020) Wound assessment. *J Community Nurs* 34(2): 28–35

Scott-Thomas J, Hayes C, Ling J, Fox A, Boutflower R, Graham Y (2017) A practical guide to systematic wound assessment to meet the 2017–19 CQUIN target. *J Community Nurs* 31(5): 31–4

Stephenson J, Fletcher J, Parfitt G, Ousey K (2021) National audit of Pressure ulcer prevalence in England: a cross-sectional study. *Wounds UK* 17(4): 45–55

Tickle J (2019) Addressing the challenges of cavity wounds in clinical practice. *Wound Care Today*. Available online: www.woundcare-today.com/journals/issue/wound-care-today/article/addressing-challenges-cavity-wounds-clinical-practice

Timmons J, Johnstone D (2022) Cavity Wounds: a juicy topic. *Wounds UK* 18(1): 81–5

Thomas S (1992) Update on alginates. *J Wound Care* 1(1): 29–32

Vowden K (2016) Defining, assessing and managing cavity wounds. *Wounds UK* 12(1): 18–23

Williams C (1997) Treatment of cavity wounds. *Practice Nurs* 8(13): 31–3

World Union of Wound Healing Societies (2019) *Consensus Document. Wound exudate: effective assessment and management*. Wounds International, London

Wounds UK (2016) *Quick Guide Cavity Wounds*. Wounds UK, London. Available online: www.wounds-uk.com

Practice point

To keep up with your continuing professional development (CPD) and gain points for revalidation, why not complete the JCN e-learning module on Sorbsan and then download your certificate: www.jcn.co.uk/course/sorbsan/details

KEY POINTS

- Cavity wounds present unique challenges in both assessment and management due to their complex anatomy and potential for complications such as tunnelling, undermining, and infection.
- Using a sterile plastic probe to determine the wound's depth and documenting the location of tunnelling or undermining can assist in obtaining measurements.
- From the patient's perspective, living with a cavity wound can significantly impact their quality of life.
- Most cavity wounds will require a wound filler/packing followed by a secondary dressing that is capable of absorbing exudate.
- In clinical practice, alginates are often used to pack cavity wounds due to their unique properties.
- Selecting an appropriate dressing regimen to maintain an optimal wound environment, combined with active patient involvement, ensures that treatment strategies are tailored to maximise the wound's healing potential.

Influence of movement, gait and compression on chronic venous insufficiency and chronic oedema

Rona Frances Campbell, Georgina Ritchie

This article, the first in a two-part series, introduces and discusses the importance of movement and gait on the lower extremity in relation to chronic venous insufficiency (CVI) and chronic oedema (CO). It outlines and highlights the importance of the venous and lymphatic systems and their influence on how fluid is moved from the periphery into the trunk. The article introduces and explores the role of important anatomical systems like the veno-muscular pumps within the lower extremity, and how underlying musculoskeletal (MSK) issues that affect movement and walking can influence the onset, chronicity, and severity of CVI and CO. It also touches on how fluid is moved from the lower extremity into the trunk. Finally, the importance of compression and its benefits are explained through key scientific principles and the vital role that it plays in fluid movement from the periphery into the trunk. The second part of the series will focus on how movement, orthotics and footwear can complement compression and their role in reducing peripheral oedema, improving gait and managing pain in the foot and ankle.

KEYWORDS:
■ Calf muscle pump ■ Venous system ■ Lymphatic system ■ Gait
■ Musculoskeletal impairment ■ Compression

Healthy venous and lymphatic systems are important in the transport of deoxygenated blood, clearance of waste products, regulation of fluid, and help to mediate inflammation while being an important first line of defence against infection (Bjork and Hettrick, 2018; Meulendijks et al, 2020). The lymphatic and venous systems are closely associated and disorder or disease in one invariably has an impact on the other (Hettrick and Aviles, 2022).

The heart is the main vital organ that pumps blood around the body, and the vascular network is what helps aid transport of fluids through the system (Mitchell, 2024). When fluid reaches the lower extremity in the vascular network and as it returns to the trunk, it is subject to the forces of gravity (Partsch, 2008). This makes fluid transport from the periphery back into the trunk challenging as the venous and lymphatic systems do not have a vital organ like the heart to move fluid proximally. Instead, fluid movement is dependent on other anatomical mechanisms to assist in fluid dynamics from the periphery to the trunk (Partsch, 2008).

Within the venous system, peripheral venous blood travels back to the trunk through a system of one-way paired semi-lunar bicuspid valves that close and prevent retrograde fluid backflow (Meissner, 2005; Simka et al, 2024). The lymphatic system contains the lymphangion, which is a distinct functional unit located between two-semilunar valves that assists the forward movement of lymph fluid (Shinaoka et al, 2020). Both systems are made up of a superficial (located near the surface of the skin) and deep system (located deeper within the body).

The other major anatomical structures within the lower extremity that help with fluid dynamics and lymphatic return are the veno-muscular pumps (VMPs) located in the musculoskeletal (MSK) system (Lattimer et al, 2017). While these are localised systems in the lower extremity they also play an important role in right arterial preload and cardiac output (Halkar et al, 2020). The VMPs move fluid movement by way of muscle contraction and joint movement.

The development of chronic venous insufficiency (CVI) and chronic oedema (CO) is the result of structural and functional failures within the venous, lymphatic and MSK systems through VMP dysfunction. The most important pump in the lower limb is the calf muscle pump (CMP). CMP dysfunction is the result of structural changes in the venous architecture altering venous outflow, incompetency in the venous valves, overload in the lymphatic system, suboptimal joint range of motion and or issues in the neuromuscular signalling in the lower extremity (Uhl and Gillot, 2015). These changes in the venous, lymphatic and MSK systems, alone or together, can result in chronic, pathological changes in the integumentary system, CVI, or CO, which may lead to ulceration and/or lymphorrhoea.

Rona Frances Campbell, clinical lead podiatry and biomechanics; Georgina Ritchie, director of education, both at Accelerate CIC

WHY DOES IMPAIRED MOVEMENT AND MOBILITY AFFECT FLUID MOVEMENT IN THE LOWER LIMB?

While understanding functional movement and complex gait analysis is beyond the scope of this article, there are some key messages to understand. These are that any change in a patient's movement or reduction in physical activity in the presence of CVI and CO will impact on the functional ability of the VMPs to move fluid from the periphery into the trunk. This will exacerbate CO and CVI leading to complications in the lower extremity, such as rebound oedema, cellulitis, the ability to self-care, the development of wounds or lymphorrhoea (Houghton et al, 2023; Campbell, 2024).

MUSCULOSKELETAL AND PHYSICAL IMPAIRMENTS

MSK conditions involve more than 150 diseases/conditions that affect the MSK system (Humphreys and Verstappen, 2022). These are characterised by impairments that affect the joints, muscles, bones and connective tissues (Humphreys and Verstappen, 2022). When MSK impairments co-exist with CVI and CO, this may impair fluid movement in the lower extremity through sub-optimal movement, such as reduced joint range of motion (ROM), gait impairment, or trigger a reduction in the amount of physical activity a person undertakes.

People with CVI, lower limb ulceration and CO are reported to experience MSK functional and physical impairments, which are summarised in *Table 1* (Araujo et al, 2016; Erdal et al, 2021; Menegatti et al, 2022).

VENO-MUSCULAR PUMPS

The VMPs are located in the lower extremity in the foot, posterior calf, and thigh (Uhl and Gillot, 2015). These pumps, especially the CMP, are frequently regarded as the 'peripheral heart' due to their pumping actions, which are key in aiding optimal fluid dynamics from the lower extremity into the proximal trunk. The efficiency of these pumps is highly dependent on a healthy, functional and efficient MSK system.

Fluid movement within the foot pump is generated through the tightening of ligaments, the fascia within the foot, and through the effect of ground reaction force, i.e. when the foot contacts the ground during weight bearing (Horwood, 2021). In the CMP and thigh pumps, when muscle groups contract within their compartments this results in joint motion which produces movement. Movement exerts pressure through the expansion of the muscle compartments on lymphatic vessels and the venous vasculature which moves fluid in the lower extremity in a proximal direction (Horwood, 2019).

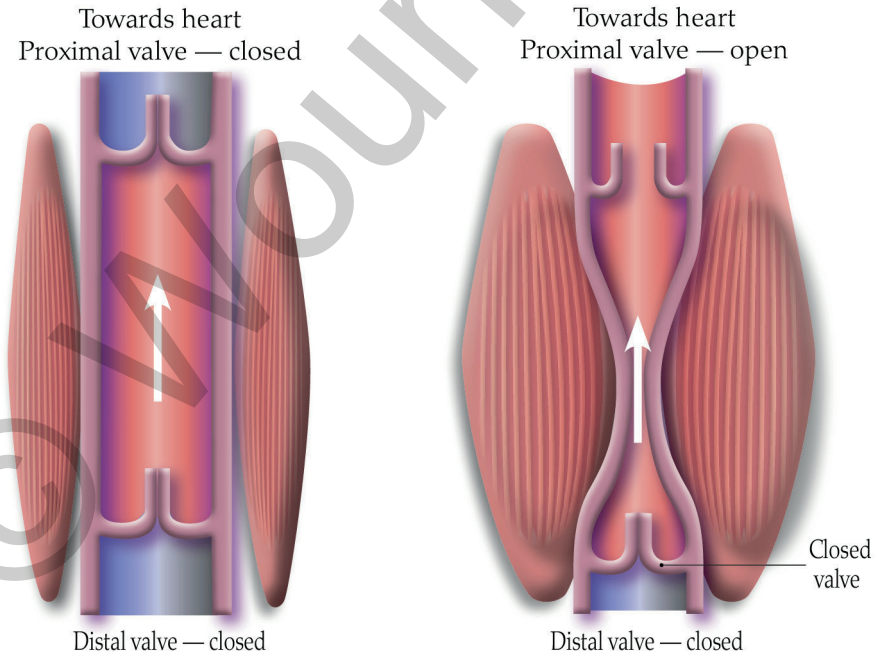


Figure 1.
Muscles relaxed (left) and muscles contracted (right).

Table 1: Common physical impairments in CVI and CO

Issue/impairment	CO	CVI
Oedema	✓	✓
Pain and/or discomfort	✓	✓
Impaired joint ROM	✓	✓
Skin changes	✓	✓
Reduced mobility	✓	✓
Altered sensation	✓	✓
Heaviness and fatigue	✓	✓
Balance impairments	✓	✓
Gait impairment	✓	✓

(Adapted with permission from Mitchell, 2024)

CALF MUSCLE PUMP

The CMP is the most important within the lower extremity, accounting for approximately 65% of ejection fraction volume (EFV) (Williams et al, 2014). EFV is defined as the proportion of venous volume ejected from the calf in a single tip-toe manoeuvre. The norm is reported to be greater than 60% (Araki et al, 1994).

CMP dysfunction is common in people with CVI and is known to affect up to 55% of this population (Williams et al, 2014). Moreover, the CMP is also associated with the development of deep vein thrombosis and there is growing evidence to suggest that the impact of CMP failure extends beyond the lower extremity, as it is associated with all-cause mortality (Houghton et al, 2023). Therefore, recognition and clinical vigilance and management of CMP dysfunction is important not only for optimal function and to reduce morbidity in the lower extremity, but also because of the higher risk of mortality in the presence of CMP dysfunction (Houghton et al, 2023).

PHYSICAL IMPAIRMENT, GAIT DYSFUNCTION AND ANKLE JOINT RANGE OF MOTION

The key biomechanical risk factors for developing CMP dysfunction are:

- Restrictions in joint ROM in the lower extremity
- Underlying MSK conditions
- Physical impairment
- Suboptimal mobility

(Nepomuceno de Souza et al, 2022; Roberts et al, 2022).

These factors can negatively impact on gait, movement, and physical activity which will increase the risk of developing CMP dysfunction or, if it is present, intensify the disease process and oedema in those with CVI and CO.

Limitations in ankle joint ROM affect gait and can result in a plethora of issues like heel, midfoot and forefoot pain, which can result in an antalgic gait pattern (change in the way someone walks, such as a limp, usually due to pain) and/or gait dysfunction (Ricci, 2020). A restriction in ankle joint ROM can also affect how proximal structures within the lower extremity function through compensatory mechanisms that exacerbate changes in gait and lead to sub-optimal movement in the whole kinetic chain (Uhl et al, 2012; Forner-Cordero et al, 2016). Importantly, changes within ankle joint movement have also been reported to be a pre-cursor to venous ulceration, and impaired ankle ROM is also related to CVI and CO severity (Araki et al, 1994; Back et al, 1995). Therefore, in the authors' clinical opinion, understanding how important CMP dysfunction is as a risk factor and mitigating the loss of ankle joint ROM, and managing issues associated with mobility, are vital for optimal patient care.

BENEFITS OF COMPRESSION IN FLUID MOVEMENT, VMP FUNCTION AND LOWER EXTREMITY HEALTH

The benefits of compression of the lower extremity in the reduction of CO, wound healing, fluid dynamics and in mitigating the impact of CVI is widely reported (Shi et al, 2021; Ritchie, 2024). A summary of its therapeutic effects can be found in *Table 2*. The application of compression is also reported to reduce pro-inflammatory cytokines and matrix metalloproteinases (Tkaczyk et al, 2021). These substances are known to be present in leg ulceration and damage the protective endothelial glycocalyx, which plays an important role in fluid dynamics and mediating inflammation (Tkaczyk, 2021).

Table 2: What does compression do to the lower extremity?

Increases pressure on the skin and underlying structures to counteract the force of gravity (squeeze)
Supports the foot, calf and thigh pumps in moving fluid and blood within the lymphatic and haemodynamic systems
Improves overall skin condition, particularly if used in combination with a robust and sustained commitment to skin hygiene, exfoliation and moisturising
Prevents backflow of venous blood, which causes venous reflux and pooling of blood in the veins
Prevents blood components from leaking into the surrounding tissues, which causes inflammation and break down of tissue
Reverses venous hypertension in the superficial veins by reducing vein diameter (elastic systems), or occluding the veins in inelastic systems
Manages swelling by supporting the lymphatic system in returning fluid up the limb through reabsorption of interstitial fluid
Prevents leucocyte adhesion to endothelial cells and reduces pro-inflammatory cytokines and matrix metalloproteinases, decreasing inflammation

(Adapted with permission from Mitchell, 2024)

'The benefits of compression of the lower extremity in the reduction of CO, wound healing, fluid dynamics and in mitigating the impact of CVI is widely reported.'

When applying compression, there are key considerations to ensure effective treatment and optimal management, such as:

- The most appropriate form of compression, taking into account stiffness, such as bandages (elastic or inelastic), hosiery garments (circular- or flat-knit), wraps, or leg ulcer hosiery kits
- The correct compression dose (mild/moderate/strong)
- Having an understanding of the underpinning scientific principles that explain how compression works in terms of its application (layers, bandaging techniques, tension) and how fluid is moved and in which direction

(Partsch and Mani, 2019; Ritchie, 2024).

The two important scientific laws that explain how compression works are Laplace's and Pascal's laws (Partsch and Mani, 2019). With Laplace's law, the dose of compression applied is defined by the pressure to the area, dependent on the radius (Partsch, 2005; Partsch and Mani, 2019; Ritchie, 2024). The pressure exerted is directly proportional to the tension with which the practitioner applies it and the number of compression layers that are applied, but inversely proportional to the circumference of the limb. Therefore, the same force applied to an area with a smaller radius, i.e. the ankles, will result in higher pressure compared with a larger radius, i.e. the thighs, which will result in a lower pressure (Ritchie, 2024). This is important when dose is considered and how the dose can be affected, either deliberately or unknowingly.

Pascal's law considers the movement of fluid in a certain direction. This is important in the lower extremity as graduated compression can aid the movement of fluid from the periphery in a

Club SQUEEZE IN

COMPRESSION **REMINDER** SERVICE

Wouldn't it be great if you could be ***reminded*** *when it's time to* ***renew*** *your* ***ActiLymph®, Adore®*** *or* ***ReadyWrap®*** *compression?*

Our ***free Compression Reminder Service*** *will give you a nudge when it's time to* ***renew your compression garment(s)****, 6 months from when you started wearing your compression.*

- ☑ *Activate the service in less than 5 minutes*
- ☑ *Get automatic text or email reminders*
- ☑ *Supports your leg health*
- ☑ *Multiple ways to renew*

Ready to activate?

Scan the QR code *to find out more and join our Squeeze In community.*

Alternatively visit or website at:

www.lrselfcare.co.uk/compression-reminder-service

Or contact our friendly Customer Services Team to order on

08450 606 707

LEADING THE SELF-CARE REVOLUTION

People.Health.Care.

ADV363 V1.1

proximal direction (Partsch and Mani, 2019).

Another important scientific concept is that of interface or sub-bandage pressure, i.e. the amount of pressure exerted at the interface between the compression material (bandage/garment) and the skin (Ritchie, 2024). For example, compression therapy plays an important role in enhancing VMP function through interface or sub-bandage pressure fluctuations during movement (Partsch and Mani, 2019; Ritchie, 2024). Peaks and troughs in pressure are more widely observed in inelastic than elastic compression systems, hence their particular therapeutic effect in CO. Each step in walking or movement across a joint in the lower extremity produces a contraction within muscle compartments, which increases each compartments' circumferential size (Kumar et al, 2012). When a person is wearing compression and moving, this in theory will increase the contact between the compression and the limb and thus increase interface pressure (Verzwyvelt et al, 2024). It is important to note that even in people who are not able to walk around to achieve the highest peaks and troughs in pressure, any movement at all will create an effect. Therefore, in the authors' clinical opinion, the myth that inelastic systems are only for mobile patients should be rejected.

This is why it is important to encourage patients who are having compression therapy to remain mobile and to optimise lower extremity movements that will increase sub-bandage pressure. This will improve the ability of the compression to enhance VMP function and maximise fluid movement in a proximal direction from the lower extremity.

The role of inelastic compression is also crucial in the reduction of inflammation, enhancing the CMP, wound healing and reducing CO. However, for compression to be beneficial, it must be applied correctly according to the scientific principles of Laplace's and Pascal's law. Misapplication can result in uneven pressure or excessive compression, which can potentially cause harm or discomfort.

CONCLUSION

This article has highlighted why it is vital to understand how the venous, lymphatic and MSK systems, in unison with compression, move fluid from the lower extremity into the trunk. Being aware of the important role that the MSK system plays in movement and how this influences lower extremity VMPs and sub-bandage pressure is crucial. Compression systems have differing therapeutic properties, and thus considering scientific laws when applying compression will help to ensure that the optimal therapeutic dose is applied, and that fluid in the lower extremity is moved in the right direction (distal to proximal). JCN

Figure 2.
Actico® cohesive inelastic compression bandage (reproduced courtesy of L&R).

REFERENCES

Araki CT, Back TL, Padberg FT, Thompson PN, Jamil Z, et al (1994) The significance of calf muscle pump function in venous ulceration. *J Vasc Surg* 20(6): 872–9

Araujo DN, Ribeiro CTD, Maciel ACC, Bruno SS, Fregonezi GAF, Dias FAL (2016) Physical exercise for the treatment of non-ulcerated chronic venous insufficiency. *Cochrane Database Syst Rev* 12(12): CD010637

Back TL, Padberg FT, Araki CT, Thompson PN, Hobson RW (1995) Limited range of motion is a significant factor in venous ulceration. *J Vasc Surg* 22(5): 519–23

Bjork R, Hettrick H (2018) Endothelial glycocalyx layer and interdependence of lymphatic and integumentary systems. *Wounds Int* 9(2): 50–5

Campbell RF (2024) Musculoskeletal Factors in Leg Ulcers: Assessment and Management. In: *Lower Limb and Leg Ulcer Assessment and Management*: 188–225

Davies JA, Bull RH, Farrelly IJ, Wakelin MJ (2007) A home-based exercise programme improves ankle range of motion in long-term venous ulcer patients. *Phlebology* 22(2): 86–9

Erdal ES, Demirgüç A, Kabalci M, Demirtas H (2021) Evaluation of physical activity level and exercise capacity in patients with varicose veins and chronic venous insufficiency. *Phlebology* 36(8): 636–43

Forner-Cordero I, Furtado F, Cervera-Deval J, Forner-Cordero A (2016) Ground reaction force patterns during gait in patients with lower limb lymphedema. *Acta Fisiátrica* 23(4): 201–7

Halkar M, Medina Inojosa J, Liedl D, et al (2020) Calf muscle pump function as a predictor of all-cause mortality. *Vasc Med* 25(6): 519–26

Hettrick H, Aviles F (2022) All edema is lymphedema: progressing lymphedema and wound management to an integrated model of care. *Wound Manag Prev* 68(1): 8–155

Horwood A (2019) The biomechanical function of the foot pump in venous return from the lower extremity during the human gait cycle: An expansion of the gait model of the foot pump. *Medical Hypotheses* 129: 109220

Horwood A (2021) The venous foot pump: modelling its function in gait. *Podiatry Rev* 78(3): 19–24

Houghton DE, Ashrani A, Liedl D, Mehta RA, Hodge DO, Rooke T, et al (2023) Reduced calf pump function and proximal deep vein incompetence are predictors for ipsilateral deep vein thrombosis. *Vasc Med* 28(1): 57–8

Humphreys JH, Verstappen SMM (2022) The burden of musculoskeletal disease. *Medicine* 50(2): 82–4

Kumar B, Das A, Alagirusamy R (2012) Analysis of sub-bandage pressure of compression bandages during exercise. *J Tissue Viability* 21(4): 115–24

Lattimer CR, Franceschi C, Kalodiki E (2017) Optimizing calf muscle pump function. *Phlebology* 33(5): 353–60

Meissner MH (2005) Lower extremity venous anatomy. *Semin Intervent Radiol* 22(3): 147–56

Menegatti E, Mandini S, Chi YW, Mazzoni G, Pagani A, Malagoni AM, et al (2022) Physical fitness changes induced by thermal aquatic standardized exercise in chronic venous disease patients. *Phlebology* 37(2): 134–42

Meulendijks AM, Franssen WMA, Schoonhoven L, Neumann HAM (2020) A scoping review on chronic venous disease and the development of a venous leg ulcer: the role of obesity and mobility. *J Tissue Viability* 29(3): 190–6

Milic DJ, Zivic SS, Bogdanovic DC, Karanovic ND, Golubovic ZV (2009) Risk factors related to the failure of venous leg ulcers to heal with compression treatment. *J Vasc Surg* 49(5): 1242–47

Mitchell A (2024) Aetiology. In: *Lower Limb and Leg Ulcer Assessment and Management*: 11–42

Nepomuceno de Souza I, Fernandes de Oliveira LF, Geraldo Izalino de Almeida IL, Ávila MR, et al (2022) Impairments in ankle range of motion, dorsi and plantar flexors muscle strength and gait speed in patients with chronic venous disorders: A systematic review and meta-analysis. *Phlebology* 37(7): 496–506

Revalidation Alert

Having read this article, reflect on:

- Your understanding of the influence of gait and movement in relation to CVI and CO
- The importance of the CMP
- How compression therapy in the lower extremity can benefit CO and CVI.

Then, upload the article to the free JCN revalidation e-portfolio as evidence of your continued learning: www.jcn.co.uk/revalidation

Partsch H (2005) The static stiffness index: a simple method to assess the elastic property of compression material *in vivo*. *Dermatol Surg* 31(6): 625–30

Partsch H (2008) Intermittent pneumatic compression in immobile patients. *Int Wound J* 5(3): 389–97

Partsch H, Mani R (2019) Physics of using compression to treat venous leg ulcers and other conditions of the lower extremities. In: *Compression and Chronic Wound Management*: 13–37

Ricci S (2020) Anatomy and venous hemodynamics of gait phases. *J Theoretical Applied Vasc Res* 5(3)

Ritchie G (2024) Clinical management of the lower limb. In: *Lower Limb and Leg Ulcer Assessment and Management*: 353–404

Roberts PJJ, Ousey K, Barker C, Reel S (2022) The role of podiatry in the early identification and prevention of lower limb venous disease: an ethnographic study. *J Foot Ankle Res* 15(1): 1–10

Shi C, Dumville JC, Cullum N, Connaughton E, Norman G (2021) Compression bandages or stockings versus no compression for treating venous leg ulcers. *Cochrane Database Syst Rev* 7(7): CD013397

Shinaoka A, Koshimune S, Suami H, Yamada K, Kumagishi K, Boyages J, et al (2020) Lower-limb lymphatic drainage pathways and lymph nodes: A CT lymphangiography cadaver study. *Radiology* 294(1): 223–9

Simka M, Czaja J, Kawalec A (2024) Clinical anatomy of the lower extremity veins — topography, embryology, anatomical variability, and undergraduate educational challenges. *Anatomia* 3(3): 136–54

Tkaczyk J, Przywara S, Ilzecka J, Ilzecki, M (2021) The influence of compression therapy on the level of inflammatory biomarkers in patients with chronic venous disease. *Acta Angiologica* 27(1): 32–6

Uhl J-F, Chahim M, Allaert FA (2012) Static foot disorders: a major risk factor for chronic venous disease? *Phlebology* 27(1): 13–18

Uhl J-F, Gillot C (2015) Anatomy of the veno-muscular pumps of the lower limb. *Phlebology* 30(3): 180–93

Verzwyvelt Z, Fazzone B, Jahuey P, Scali S, Berceli S, Jacobs B, Robinson S (2024) Continuous sub-bandage pressure monitoring identifies dynamic metrics to characterize the efficacy of compression therapy. *J Vasc Surg Venous Lymphat Disord* 12(3): 101781

Williams KJ, Ayekoloye O, Moore HM, and Davies AH (2014) The calf muscle pump revisited. *J Vasc Surg Venous Lymphat Disord* 2(3): 329–34

KEY POINTS

- Healthy venous and lymphatic systems are important in the transport of deoxygenated blood, clearance of waste products, regulation of fluid, and help to mediate inflammation while being an important first line of defence against infection.
- The lymphatic and venous systems are closely associated and disorder or disease in one invariably has an impact on the other.
- The development of CVI and CO is the result of structural and functional failures within the venous, lymphatic and MSK systems through VMP dysfunction.
- Any change in a patient's movement or reduction in physical activity in the presence of CVI and CO will impact on the functional ability of the VMPs to move fluid from the periphery into the trunk.
- The CMP is the most important within the lower extremity, accounting for approximately 65% of EFV.
- The benefits of compression of the lower extremity in the reduction of CO, wound healing, fluid dynamics and in mitigating the impact of CVI is widely reported.
- The two important scientific laws that explain how compression works are Laplace's and Pascal's laws
- Another important scientific concept is that of interface or sub-bandage pressure.

Challenges of managing lipoedema: insights from patient/clinician surveys

Sharie Fetzer, Teresa Hill

Lipoedema is thought to be a genetic chronic condition that causes an abnormal build-up of fat and connective tissue in the legs, thighs, buttocks, and sometimes the arms (Wounds UK, 2017). Due to lack of understanding and no definitive diagnostic test, the condition is often confused with conditions such as lymphoedema or obesity (Child et al, 2010). This paper presents the findings of two surveys — a patient and healthcare professional one — undertaken by Daylong Direct in association with Lipoedema UK and this journal. The former explored the multifaceted challenges faced by individuals living with lipoedema, including diagnostic delays, treatment gaps, emotional impact, and unmet healthcare needs, while the latter captured data on healthcare professionals' awareness and knowledge of lipoedema and treatments available, highlighting the need for more education to improve patient care. The survey results provide valuable insights for improving clinical practice and patient support.

KEYWORDS:
■ Lipoedema ■ Patient survey ■ Healthcare professional survey

Lipoedema, derived from the terms 'lipo' (fat) and 'oedema' (swelling), is a condition characterised by disproportionate, symmetrical subcutaneous fat distribution primarily in the arms and legs (Wounds UK, 2017). The affected areas are typically the hips, buttocks, and legs, although the arms may also be involved (Grigoriadis, 2022). Notably, the hands and feet are not usually affected (Lipoedema UK).

The precise cause of lipoedema remains uncertain, although it is believed to result from multiple contributing factors. The condition primarily affects individuals assigned female at birth and has been associated with hormonal changes, particularly during puberty, pregnancy, and menopause, with fluctuations in oestrogen levels playing a significant role (Wounds UK, 2017). A familial predisposition to lipoedema is frequently observed, suggesting a strong genetic component in its development (Lipoedema UK). Ongoing research is actively exploring this genetic link (Grigoriadis, 2022).

'The German Society of Phlebology and Lymphology recently proposed the latest definition of lipoedema as: "a painful, disproportionate symmetric distribution of adipose tissue of the extremities occurring almost exclusively in women" (Faerber et al, 2024).'

Patients with lipoedema can encounter numerous challenges, including limited recognition and lack of knowledge of the condition by healthcare professionals (HCPs), often resulting in a delay in access to treatment, misdiagnosis and substandard treatment (Okhovat and Alavi, 2015). There is also a 'postcode' lottery for access to appropriate management services, which is important as the condition brings complexity that often requires a multidisciplinary approach (Wounds UK, 2017). Additionally, patients frequently experience significant physical psychosocial challenges, such as restricted mobility, difficulty performing activities of daily living, and distress related to the visible appearance of the condition (Williams, 2018).

PREVALENCE OF LIPOEDEMA

The prevalence of lipoedema and its true impact on the population remain poorly understood, as limited research has been conducted into this condition (Wounds UK, 2017). This dearth of data may stem from lack of recognition and frequent misdiagnosis by HCPs, or patient potential reluctance to seek medical assistance (Wounds UK, 2017; Clarke et al, 2022). Childs et al (2010) indicated a prevalence of one in 72,000, while Kruppa et al (2020 estimated that about 10–11% of the adult female population may be affected. However, in reality these figures are likely to be much higher (Wounds UK, 2017).

DIAGNOSING LIPOEDEMA

Diagnosing lipoedema can be challenging and is often overlooked by clinicians, due to lack of knowledge and understanding, resulting in delayed diagnosis and treatment, which can significantly impact patient wellbeing (Wounds UK, 2017). Additionally, there is currently no specific diagnostic test or standardised criteria for lipoedema, making diagnosis reliant on patient history and clinical examination (Fife et al, 2010). Contributing further to the difficulty is the fact that lipoedema is often mistaken for similar conditions,

Sharie Fetzer, chair, Lipoedema UK; Teresa Hill, clinical nurse specialist — lymphoedema, Enfield Community Lymphoedema Service, Royal Free London NHS Foundation Trust

such as lymphoedema or obesity (Okhovat and Alvavi, 2015; *Table 1*). While these conditions can coexist, HCPs should be familiar with the distinct characteristics of lipoedema to ensure accurate diagnosis and implementation of an appropriate treatment plan (Wounds UK, 2017).

Other signs and symptoms that often accompany lipoedema include:

- Significant disproportion of hip to waist ratio
- Abnormal gait, muscle weakness, joint pain and poor mobility due to bulkiness of legs
- Cuffing or bracelet effect at the ankles or wrists, where the tissue enlargement ends abruptly before reaching the hands or feet
- In the early stages of lipoedema, the upper body may remain slim while the lower body enlarges due to fat accumulation around the hips, thighs, and legs
- As lipoedema progresses to later stages, mobility becomes restricted, and the condition may worsen with chronic symptoms, including joint-related issues and lipolymphoedema in later stages (Okhovat and Alvavi, 2015; Wounds UK, 2017; Lipoedema UK).

TREATMENT OF LIPOEDEMA

Lipoedema is a complex, long-term condition that significantly affects both physical health and mental wellbeing (Wounds UK, 2017; Clarke et al, 2022). Since there is no cure, symptom management remains the primary goal of treatment (Lipedema Foundation, 2022). A multidisciplinary approach is recommended, involving specialists such as lipoedema and lymphoedema experts, physiotherapists, occupational therapists, dietitians, podiatrists, nurses and pain clinics (Wounds UK, 2017). However as said, access to treatment and mental health support remains a challenge, as many HCPs, particularly GPs, often fail to recognise lipoedema, leading to limited availability of essential treatments, i.e. compression garments (Fetzer, 2020).

Practice point

Stemmer's sign is negative or absent when the skin fold at the base of the second toe or middle finger can be pinched and lifted. A positive Stemmer's sign (when skin cannot be pinched) is indicative of lymphoedema (Wounds UK, 2017).

Wounds UK (2017) suggested that management should focus on three outcomes, individualised according to severity of symptoms and degree of tissue enlargement (*Table 2*).

There are several non-surgical and surgical management options available that may assist in preventing disease progression and manage symptoms. However, their effectiveness depends on the extent of tissue involvement and specific presenting symptoms and so are not suitable for all lipoedema patients (Wounds UK, 2017).

Non-surgical adjunctive management may include:

- Manual lymphatic drainage (MLD) — may reduce pain and discomfort (Haesler, 2016)
- Kinesiology taping — may improve circulation and lymph drainage (Wu et al, 2015)
- Compression therapy — via compression garments, i.e. hosiery, wraps, or lipoedema-specific garments (Ricolfi et al, 2024).

Practice point

Some patients with lipoedema, may also go on to develop secondary lymphoedema because of damage to the lymphatic system known as lipolymphoedema (Fife et al, 2010; Wounds UK, 2017).

Surgical management

This involves liposuction, which is not currently available for lipoedema on the NHS and has to be accessed privately (Lipoedema UK). Several studies have indicated that non-cosmetic liposuction has been shown to have a significant improvement in mobility, gait, quality of life and pain (Kruppa et al, 2022; Wright et al, 2023). Despite this, the National Institute for Health and Care Excellence (NICE) indicates that there is not enough evidence to support its routine use for lipoedema and has called for more research into this area (NICE, 2022).

PATIENT AND HCP SURVEYS

Purpose

Daylong Direct, in collaboration with Lipoedema UK and JCN, conducted two surveys — one for patients and one for HCPs — to gain

Table 1: Comparing characteristics of lipoedema, lymphoedema and obesity (adapted from Okhovat and Alvavi, 2015; Wounds UK, 2017)

	Lipoedema	Lymphoedema	Obesity
Skin	Skin is cool to touch, and may have an orange peel appearance	Skin appears thickened and fibrous	Usually, soft and intact
Affected areas	Bilateral and symmetrical, usually legs, hips and buttocks	Asymmetrical, may be unilateral or bilateral	Symmetrical and bilateral, any location on the body
Present in foot and arm	Does not usually affect hands or feet	Foot and hands can be affected	All body areas can be affected
Pain	Hypersensitivity or tenderness to touch or pressure	Not hypersensitive to touch or pressure	None
Effect of dieting	No weight loss or less weight loss noted over areas of lipoedema	Weight loss will be proportionate over trunk and lower limbs	Proportional weight reduction
Stemmer's sign	Usually negative	Usually positive	Negative
Bruising	Occurs without cause of minor trauma	Not usually	No
Sex	Predominately female	Male or female	Male or female
Onset	Usually during puberty, after pregnancy or menopause	Any age	Any age
Family history	Common	Usually only in primary lymphoedema	Common

Table 2: Management and treatment outcomes (adapted from Wounds UK, 2017)

Outcome	Principles of lipoedema management
Maximising an individual's ability to manage their condition	▸ Patient education ▸ Diet — healthy eating and weight management ▸ Exercise to improve mobility ▸ Skin care ▸ Compression ▸ Pain management
Health progression and prevention	▸ Weight management ▸ Compression therapy ▸ Management of comorbidities such as lymphoedema/diabetes
Management of symptoms	▸ Pain management ▸ Physical activity and improving mobility ▸ Oedema ▸ Psychosocial issues

deeper insights into the challenges surrounding the diagnosis, treatment, and impact of lipoedema. The surveys also aimed to enhance understanding of the obstacles clinicians face in managing the condition.

Methodology

Survey one was distributed to individuals with lipoedema by Lipoedema UK, who invited their members to participate via email. This patient survey included 44 multiple-choice questions, where participants selected the most appropriate answers. To add depth and a qualitative perspective, individuals were also invited to provide a short free-text summary of their personal experiences and challenges, which 71% (n=108) completed.

The clinician survey was sent out by JCN to their database of HCPs, who were similarly invited to take part via email.

A total of 153 individuals with lipoedema completed survey one and 950 HCPs survey two. Common themes emerged following analysis of the data, which are discussed below.

Survey one: scope and findings

The age of participants ranged widely, from 18 to over 75 years old. The largest age group represented was 55–64 years, accounting for 27% (n=42) of respondents, while the smallest age group was those aged 18–24, comprising just 1.3% (n=2) of participants.

There was a fair representation of participants from across the UK — Northern Ireland, England, Scotland and Wales. Many participants were resident in southeast England (36%, n=55), while the lowest representation was from northeast England and Northern Ireland (3%, n=4).

Data captured from survey one included the following domains.

Diagnostic delays and unmet healthcare needs

Over 45% (n=69) of participants reported waiting more than 10 years for a diagnosis, while only a small fraction (9%, n=15) received a diagnosis within three months of presenting to a HCP *(Figure 1)*. Access to specialists knowledgeable about lipoedema was notably limited; 37% (n=49) described it as very difficult, and 17% (n=23) indicate that they had never been able to access a specialist. Just 3% (n=4) reported finding access easy *(Figure 2)*.

The distance participants travelled to receive care or see their lipoedema specialist varied widely. The majority (30%, n=40) travelled between five and 20 miles, while 8% stated that they had travelled over 100 miles.

HCPs' knowledge of lipoedema

Many respondents expressed significant frustration regarding the lack of knowledge and education about lipoedema among HCPs. This became particularly evident in the free-text comments provided at the end of the survey. Poor recognition of the disease, failure to diagnose and access to care were highlighted by 40% (n=43) of respondents. Their comments further reflect the distress and frustration caused by misdiagnosis, with some reporting that HCPs refused to acknowledge the condition altogether, often misdiagnosing it as lymphoedema or attributing symptoms solely to being overweight. Participants also frequently used words like 'frustration' and 'anger' to express their dissatisfaction with HCPs' lack of understanding and the long waiting lists for treatment. *Table 3* includes some respondents' comments regarding HCPs' lack of knowledge and education.

Comorbidities

Lipoedema and lymphoedema often coexist, a reality experienced by 33% (n=51) of survey participants. Interestingly, three respondents described themselves as 'lucky' or 'blessed' to have both conditions, as having lymphoedema granted them access to HCPs who could accurately diagnose lipoedema and provide essential treatments, such as compression garments and MLD. One respondent shared that their lipoedema symptoms were significantly worse than their lymphoedema ones. However, they felt compelled to exaggerate the severity of their lymphoedema

Table 3: A few respondent opinions on HCPs' knowledge of lipoedema

- *The only reason I do know what I know is because I research on a regular basis, then inform my GP*
- *I've had very little, if any support from my GP*
- *I feel that my GP doesn't understand how humiliating it is to feel abnormal and want to hide my legs*
- *I feel I am being seen at the lymphoedema clinic because no one else knows what to do with me or treat my symptoms which I have been going to the doctors for years about*
- *My GP does not acknowledge lipoedema*
- *NHS still doesn't seem to notice this condition at all*
- *There have been opportunities to recognise the symptoms, but general ignorance has led to the progression of the disease*
- *I'm very surprised how few clinicians actually recognise or know anything about lipoedema*
- *The GPs in the UK need to be required to do training for lipodema! Half of them don't even know what it is!*
- *The medical profession has little knowledge of the disease and certainly no compassion*
- *Medical staff incorrectly write lymphoedema on my medical records despite correcting them on each occasion.*

for fear of being discharged from the lymphoedema service, which would have restricted their access to essential treatments.

Impact on self-care

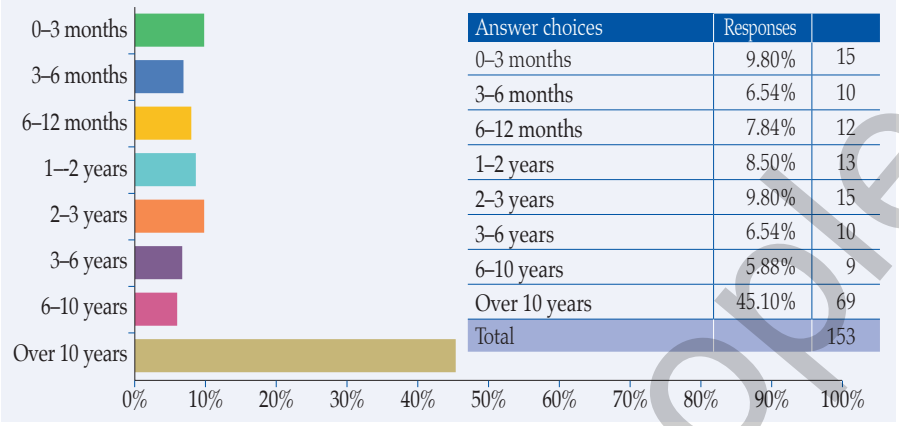
Managing lipoedema is a significant aspect of life for many individuals with the condition. Only 9% (n=14) reported spending no time on management, while the remainder dedicated between one hour to over 20 hours per week managing their condition. The majority (26%, n=40) spent three to five hours per week on management. Many participants required additional assistance, with 24% (n=37) needing regular help and 28% (n=43) occasionally requiring support to manage their lipoedema.

Out-of-pocket expenses

Patients with lipoedema are economically impacted with many paying for aspects of care, including compression therapy, travel to clinics, doctor's visits, skin care, medication, MLD and non-cosmetic liposuction.

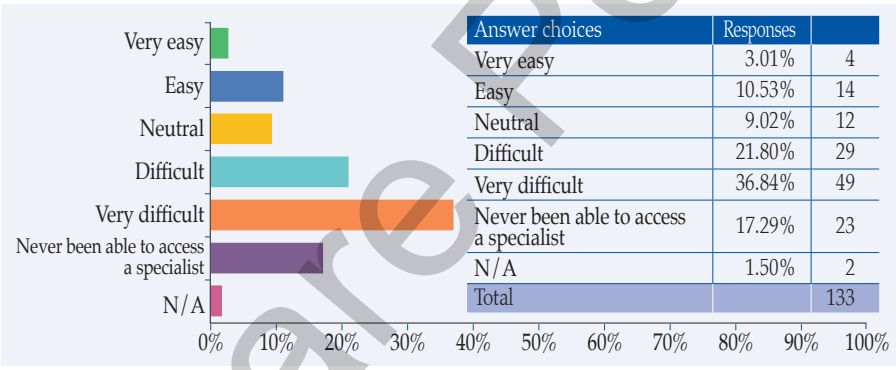
Costs associated with compression and surgical interventions were explored in further questions within the survey. Management expenditures were variable and for the majority of respondents (58%, n=89), costs ranged between £0–£100 per month. However, a small proportion (3%, n=5) reported spending over £500 per month.

When asked about paying for non-cosmetic liposuction, 29 respondents provided an answer, with 27 confirming that they had paid for the treatment. The cost of private liposuction was significant, with some individuals (27%, n=8) spending over £20,000 on treatment. Among these 27 respondents, nine had undergone the procedure two to three times, four had paid for it four to five times, and one patient had undergone five procedures. The majority (65%, n=19) had their liposuction performed in the UK, while 28% (n=8) travelled abroad for surgery. Of those who underwent surgery abroad, 17% (n=5) experienced postoperative complications which were treated by the NHS on their return to the UK. While this did not incur direct costs for the patients, it may have indirectly placed additional strain on an already stretched NHS. This survey did not examine the nature of post-operative complications experienced by participants or the time elapsed since their surgeries. Further research in this area is needed.



Answer choices	Responses	
0–3 months	9.80%	15
3–6 months	6.54%	10
6–12 months	7.84%	12
1–2 years	8.50%	13
2–3 years	9.80%	15
3–6 years	6.54%	10
6–10 years	5.88%	9
Over 10 years	45.10%	69
Total		153

Figure 1.
Length of time for patients to receive correct diagnosis.



Answer choices	Responses	
Very easy	3.01%	4
Easy	10.53%	14
Neutral	9.02%	12
Difficult	21.80%	29
Very difficult	36.84%	49
Never been able to access a specialist	17.29%	23
N/A	1.50%	2
Total		133

Figure 2.
Ease of access to HCP who understands and treats lipoedema.

Several respondents believed that surgery was not an option due to its unavailability on the NHS and the high cost of private treatment. Additionally, seven respondents specifically stated that liposuction for lipoedema should be made available on the NHS.

Below are a few of the powerful comments made by respondents regarding lipoedema:

I would like the NHS to reconsider classifying all liposuction as cosmetic and expand the available surgery to lipoedema patients where the lipoedema affects their day-to-day life.

The surgery being classed as 'cosmetic' by the NHS is frankly offensive and cruel. There is nothing cosmetically attractive about my 'liposuction' legs.

I should not have had to pay £25k of my own money for this treatment, it is incredibly unfair just to have a 'normal' pair of legs.

A few respondents did not pay for their compression garments (18%, n=26). However, many respondents (47%, n=73) indicated that they paid anything from £1–500/year. Interestingly, a small percentage paid over £500/year (6%, n=8) when purchasing their compression garments.

Respondents were asked whether their regular household income and expenditure were affected by lipoedema. Some felt this question was not applicable to their situation (22%, n=31), while 25% (n=36) reported no impact. A slight-to-moderate decrease in income and expenditure was experienced by 19% (n=27), whereas 15% (n=21) reported a significant decrease.

Treatment options available

A significant portion of respondents (46%, n=71) had not undergone non-surgical liposuction. For 26% (n=40), this treatment was not available. Only one respondent had surgery scheduled on the NHS in the next 12 months — it is unclear if this surgery was purely for lipoedema or for another condition (i.e. lymphoedema), as surgery just for lipoedema is not usually available via the NHS. Additionally, 3% (n=4) indicated that they did not wish to undergo liposuction.

The majority of respondents (87%) had either been prescribed or had purchased compression garments for managing their lipoedema. Compression garments were most commonly measured by lymphoedema specialists (34%, n=47), while other clinicians, such as general practice nurses (GPNs) or GPs accounted for 11% (n=15) of measurements. Additionally, 11% (n=16) of participants reported measuring themselves for their garments.

Participants received their garments through various routes. For 40% (n=56), their clinician ordered the garments and had them sent directly to their home. Another 13% (n=18) obtained them from their pharmacy, while 11% (n=15) received them directly from their clinician during a clinic visit. Additionally, 16% (n=23) ordered the garments themselves and had them delivered to their home, and a small proportion (5%, n=7) had their carer place the order for direct home delivery.

Participants indicated that 47% (n=67) wore their garments daily, 15% (n=20) wore them three to four times per week, and 13% (n=19) wore them one to two times per week. Furthermore, 10% (n=14) did not wear their garments at all. When considering the effectiveness of compression garments for symptom management, 42% (n=59) found them very effective/effective; 28% (n=40) were neutral; and 12% (n=17) considered them either ineffective or very ineffective.

The comfort of compression hosiery was a concern for many respondents, with 27% (n=39) finding it uncomfortable and 18% (n=26) considering it very uncomfortable. Various factors influenced whether participants wore their garments or found them comfortable. The most common reason being heat and the non-breathable fabric that the garments were made from (39%, n=54). Other factors included dislike of wearing them under clothing (32%, n=45), poor fit (32%, n=44), limited garment/clothing options (21%, n=30), and cost (19%, n=27).

Participants were asked whether they had support when facing issues with ordering, fitting, or their prescriptions. While 54% (n=76) reported having support, 45% stated that they did not receive any assistance. Additionally, after receiving garments, 56% indicated that they had no further advice on fitting or applying them, with 54% also indicating that they received no advice on how to wash or replace their compression garments.

Common themes that emerged from the respondents' comments included GPs' refusal to prescribe compression garments and poor access to HCPs, such as lymphoedema specialists, for advice and measurement of the garments.

Many participants expressed that they were overall dissatisfied (25%, n=33) or very dissatisfied (51%, n=86) with the available treatment options. Furthermore, only 24% (n=32) felt well-informed about treatment options, with numerous participants feeling either poorly (22%, n= 30) or very poorly informed (17%, n=23%).

Socio-economic impact

The impact of lipoedema on respondents' employment, school, or university life varied. While 30% (n=42) reported no impact, the remaining respondents experienced challenges. Specifically, 20% (n=28) had to reduce their work hours, 13% (n=18) were required to change jobs, and another 13% were unable to attend. Additionally, 7% (n=10) were unable to work or train in their desired or previously trained field, and 4% (n=6) had lost their job or university place.

Within the survey's comment section, many respondents highlighted the significant impact that lipoedema has on their daily lives. Their testimonials provide first-hand insight into the true effects of the condition, as illustrated by the quotes below:

- Relationships:
  - *I don't see friends anymore*
  - *Impacts on friend and marital relationships*
- Pain:
  - *I'm in pain daily and bruise and fall easily*
  - *I suffer every day in agony, and have experienced leg pain since I was 11*
- Confidence and self-image:
  - *This is mainly a woman's disease where the biggest drawback is judgement. Because we are judged to be lazy or to have made ourselves 'fat' we are left to suffer. This would not happen if it were a male disease*
  - *Women with lipoedema are bullied, confused, frightened, disgusted and desperate about the way they look and appear to others. It's time we started supporting women in a whole host of ways, not punishing them further because of others' ignorance and witless judgements*
  - *I probably appear like a lazy slob but I am so exhausted*
- Fat shaming by HCPs:
  - *I have not come across any medical people who know anything about lipoedema, they all say lose weight*
  - *GPs need educating. Socially too, their bedside manner regarding lipoedema is, quite frankly, disgusting. Fat shaming at its finest*
  - *It seems there is a lot a negative reaction when lipoedema is mentioned, almost as if it's another excuse for being fat. I've found it all very depressing*
  - *The disease that officially never was and maybe never will be treated adequately. A fat woman's problem*
- Not being listened to or taken seriously:
  - *For last 10 years I have been told by various GPs to*

try harder. I have been in tears crying down the phone as I was spending money and time at the gym with a personal trainer to no avail
- *I would love to have someone listen to me and take on board what I say*

- Mental health:
  - *I feel I just want to hide away from the world*
  - *There is no magic cure for this. Too many women just give up, though I can understand why. I've got incredible discipline and resilience, not everyone has*
  - *I was discharged from the clinic as there was nothing more they can do for me, this ruined my mental health*
  - *It is an isolating, debilitating and humiliating condition*
  - *I am really struggling both physically and mentally due to this condition and feel totally alone and isolated*
  - *I feel like I have fallen into a black hole.*

Summary of survey one

Survey respondents expressed significant frustration with the lack of awareness and understanding of lipoedema among HCPs, as well as challenges in accessing diagnosis and treatment. Many highlighted barriers such as misdiagnosis, being dismissed by healthcare providers, and difficulties obtaining essential treatments like compression garments.

Lipoedema also had a profound impact on daily life, employment, and mental wellbeing. Participants' testimonials reflect the true burden of lipoedema, emphasising the need for better recognition, support, and access to treatment.

Survey two: scope and findings

A total of 950 clinicians completed survey two. However, as questions were not mandated, there was an average response rate of 68% for each question.

There was clinician representation across England, Scotland, Wales and Northern Ireland, with most respondents stating that they practiced in England (26%, n=172).

The most common primary place of work indicated by participants was community home visits (32%, n= 206), with other places of work being 17% (n=110) in acute settings (hospitals), 16% (n= 106) in GP practices,14% (n=90) in community clinics, 8% (n=53) in nursing homes, and a small number of respondents working in private clinics (4%, n=29).

Participants reported a wide range of professional job titles making analysis challenging. Community-based nurses identified themselves under various titles, including community nurses, community nursing staff, district nurses, and district nursing sisters, collectively representing 26% (n=167) of respondents. Practice nurses and primary care nurses accounted for 12% (n=76), while registered general nurses made up 13% (n=84). Advanced practitioners and nurse practitioners constituted 7% (n=44), and tissue viability nurses 9% (n=56). Non-qualified healthcare staff comprised 4% (n=28), while lymphoedema and leg ulcer specialists accounted for 8% (n=53). General practitioners (GPs) represented only 0.46% (n=3) of the respondents.

Data captured from survey two included the following domains.

How aware of lipoedema were respondents?

The majority of HCPs stated that they had heard of lipoedema (90%, n=858). However, when asked whether they were confident in their ability to recognise and treat the condition, only 9% (n=77) were very confident or confident (37%, n=324). The remainder of respondents indicated that they were not confident (42%, n=360), or unsure (9%, n=81). Additionally, 2% (n=21) indicated that they had never heard of lipoedema.

Training and education

Overall, a significant proportion of HCPs (74%, n=570) had not received any formal training or education on lipoedema.

Frequency of patients presenting where lipoedema is suspected

Survey results suggest that patients with suspected lipoedema did not present regularly to HCPs, with 35% (n=272) of clinicians reporting encounters approximately once every three months and 25% (n=197) seeing them about once a month. Some clinicians indicated more frequent presentations, with 12% (n=97) seeing patients every two weeks and 7% (n=56) encountering them weekly. A small percentage (6%, n=45) reported never seeing lipoedema patients, while 11% (n=86) were unsure if they had encountered any.

Challenges HCPs face when diagnosing lipoedema

HCPs indicated a variety of challenges when diagnosing lipoedema (*Figure 3*). The most common issues related to lack of training and knowledge, being unsure if signs and symptoms relate to lipoedema or other clinical conditions, and lack of knowledge and training among healthcare colleagues.

Specialist services for lipoedema in your practice area

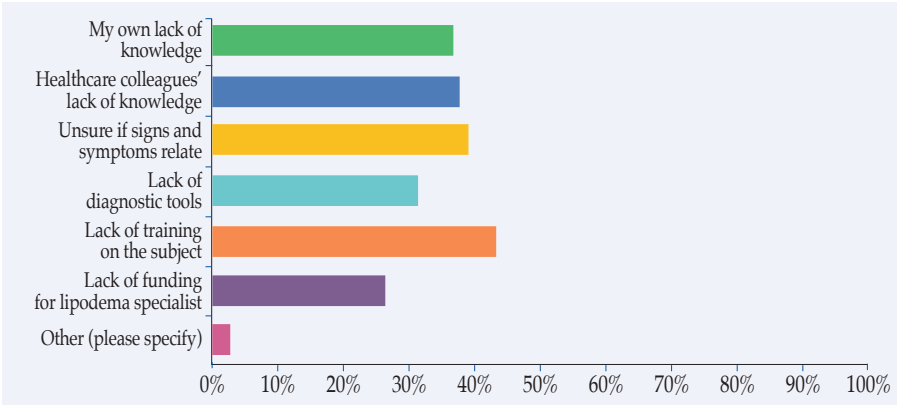
HCPs were asked if there were any specialist lipoedema services in their practice area. However, there was a significant drop off in responses which may indicate lack of knowledge as to who can support these patients. Only 20% (n=155) had a designated service, 29% (n=255) of respondents were unsure if any services were available. For 2% (n=18), a service was available but was no longer taking patients and 1.5% (n=12) had a service but they were not allowed to refer into it.

Average patient waiting times for referral to a specialist service

Only 16% of respondents chose to answer this question. HCPs indicated that most patients had to wait one to three months to be seen (37%, n=56), while a wait of four to six months was experienced for 18% (n=27), and 5% were waiting six to 12 months and 4% waited over a year to be seen. A small percentage (7%, n=11) were fortunate to be seen in less than two weeks.

Can patients with lipoedema in your area self-refer to the service?

Only 16% of respondents answered this question. Among them, 22% (n=34) indicated that patients in



Answer choices	Responses	
My own lack of knowledge	46.02%	358
Lack of knowledge among healthcare colleagues	47.17%	367
Unsure if signs and symptoms relate to lipoedema or other conditions	49.36%	384
Lack of diagnostic tools	39.33%	306
Lack of training on the subject	54.24%	422
Lack of funding for a lipoedema specialist service	32.78%	255
Other (please specify)	3.34%	26
Total respondents: 778		

Figure 3.
HCPs' challenges when diagnosing lipoedema.

some areas could self-refer. The majority (41%, n=64) reported that self-referral was not an option, while 37% (n=57) were unsure whether patients could self-refer.

Which services are available to lipoedema patients in your area?

The most commonly available service reported by respondents was compression therapy, accessible in 47% (n=305) of areas. Specialist consultations, such as with endocrinologists or vascular specialists, were available in 29% (n=191) of areas. Other services included physical therapy (13%, n=83), MLD (12%, n=80), nutritional counselling (11%, n=77), and diagnostic imaging (10%, n=69). Psychological support (9%, n=57) and surgical options (5%, n=30) were available in only a few areas. Additionally, 12% of respondents reported no access to specialist services, while 40% (n=259) were unsure whether any specialist services were available.

What treatments do HCPs typically recommend lipoedema patients?

Various treatments were recommended by HCPs, with the most common being compression garments (80%, n= 501), followed by lifestyle modifications such as diet and exercise (60%, n=380), physiotherapy (926%, n=164), psychological support (24%, n=151), MLD (17%, n=110), medication (15%, n=97), surgical intervention (6%, n=40), and non-cosmetic liposuction (5%, n=31). Of note, 66% responded to this question, however it is not clear from responses if these services were just a recommendation or actually available for patients to access.

When asked how they found current treatment options available in their practice for people with lipoedema, HCP respondents indicated that they found current treatment either slightly effective (27%) or moderately effective (24%). A small number of HCPs (6%) found current treatments very effective and 9% found them not effective.

Use of compression garments

Made-to-measure compression garments were the most commonly used product among survey respondents (44%), followed by lymphoedema garments (24%) and specialist lipoedema garments (11%).

Summary of survey two

The HCP survey results highlight significant gaps in knowledge, training, and service availability for lipoedema care. A large proportion of HCPs (74%) had not received formal education on lipoedema, which may contribute to the condition being seen infrequently in clinical practice. These findings emphasise the need for improved education, clearer referral pathways, and greater access to specialist services to enhance the care of patients with lipoedema.

Discussion

These two surveys provide valuable insight into the challenges faced by individuals with lipoedema and the HCPs who treat them. Patients frequently struggle to access knowledgeable HCPs, often facing misdiagnoses of obesity or lymphoedema before receiving a correct lipoedema diagnosis. Long waits for treatment, if available at all, contribute to frustration and distress. The perceived lack of awareness among HCPs, particularly GPs — some of whom did not acknowledge the condition's existence — further exacerbates these difficulties.

Lipoedema also has significant economic implications for patients. Many reported substantial out-of-pocket expenses for treatments, including travel, compression garments, and non-cosmetic liposuction, with some spending over £20,000 for treatment abroad. The condition also affects employment, with 20% (n=28) reducing work hours, while 13% (n=18) had to change jobs or were unable to work due to their condition.

The overall impact on quality of life is profound, with patients reporting issues related to relationships, chronic pain, body image concerns, lack of recognition from HCPs, fat shaming, and mental health struggles. These findings are consistent with studies undertaken by Clark et al (2022) and the Lipedema Foundation (2022), which identified depression, eating disorders, loneliness, feelings of inferiority, and isolation as common experiences among individuals with lipoedema.

For HCPs, the survey revealed a significant gap in education and training, with 74% having received no formal training on lipoedema. Clarke et al (2022) suggested that barriers to care and reluctance to treat individuals may stem from a lack

of knowledge about the condition, particularly among GPs who were unwilling to learn more about it.

Access to specialist services varied widely, with compression therapy being the most available (47%), followed by specialist consultations (29%), physical therapy (13%), and MLD (12%). Psychological support (9%) and surgical options (5%) were particularly scarce, and 12% of HCPs reported having no specialist services to refer patients to, while 40% were unsure if any existed.

Self-referral options for patients were inconsistent, with 41% stating it was not possible and 37% uncertain. Among treatment products, made-to-measure compression garments were the most commonly used (44%), followed by lymphoedema garments (24%) and specialist lipoedema garments (11%).

These findings highlight significant gaps in both patient access to care and clinician education on lipoedema, emphasising the urgent need for greater awareness, training, and access to appropriate support. Delayed diagnosis and limited comprehensive treatment options remain major barriers for patients. The financial burden is substantial, with many individuals facing high out-of-pocket expenses and social consequences. Additionally, the clinical survey indicated that while awareness of lipoedema exists, knowledge of proper diagnostic methods and treatment protocols is still lacking, potentially leading to suboptimal care. Although treatment options are available, not all patients find them accessible or comfortable, underscoring the need for more diverse and effective solutions.

Limitations

Both surveys were distributed online, limiting participation to individuals who are computer-literate and able to complete an online survey, which potentially restricts access for a broader population. The patient survey was distributed via Lipoedema UK, meaning only those within their database had access, which may not reflect the wider population who lack information about lipoedema treatment. Similarly, the clinician survey was shared through the JCN website, restricting participation to its members and excluding a broader range of HCPs, such as GPs.

Despite the known challenges of low response rates and selection bias in surveys (Eysenbach, 2005), a reasonable number of responses were received, allowing conclusions to be drawn regarding diagnosis, treatment, access to care, and impact on quality of life. The findings also highlighted the need for improved HCP education and access to treatments to enhance patient outcomes.

CONCLUSION

The results from both the patient and clinician surveys emphasise the need for increased awareness of lipoedema, better training for HCPs, and more accessible and targeted treatment options. The healthcare community needs access to better diagnostic tools, standardised care pathways, and greater accessibility to specialised treatments to improve quality of life for individuals living with lipoedema. Lipoedema presents a complex array of physical, emotional, and societal challenges. It would be beneficial for patients to have garments specifically designed to manage their condition and needs available on prescription. Research into effective interventions and broader education for HCPs is crucial for creating a more informed and supportive environment for those affected by lipoedema. JCN

REFERENCES

Child AH, Gordon KD, Sharpe P, et al (2010) Lipedema: an inherited condition. *Am J Med Genet* 152A(4): 970–6

Clarke C, Kirby JN, Smidt T, Best T (2022) Stages of lipoedema: experiences of physical and mental health and health care. *Qual Life Res* 32(1): 127–31

Eysenbach G (2005) Using the internet for surveys and research. In: Anderson J, Aydin C, eds. *Evaluating the Organizational impact of Healthcare Information Systems*: 129–43

Faerber G, Cornely M, Daubert C, et al (2024) S2k guideline lipedema. *J Dtsh Dermatol Ges* 22(9): 1303–15

Fife CE, Maus EA, Carter MJ (2010) Lipedema: a frequently misdiagnosed and misunderstood fatty deposition syndrome. *Adv Skin Wound Care* 23(2): 81–92

Fetzer A (2020) Women in dire need: the far-reaching impact of lipoedema on women's lives. *Br J Community Nurs* 25(Sup4): S6–S9

Grigoriadis D, Sackey E, Riches K, et al (2022) Investigation of clinical characteristics and genome associations in the 'UK Lipoedema' cohort. *PLoS ONE* 17(10): e0274867

Haesler E (2016) Evidence summary: single modality treatment of lymphoedema: manual lymphatic drainage. *Wound Practice Res* 24(2): 116–18

Kruppa P, Georgiou I, Biermann N, et al (2020) Lipedema — pathogenesis, diagnosis, and treatment options. *Dtsch Arztebl Int* 117(22–23): 396–403

Kruppa P, Georgiou I, Schmidt J, Infanger M, Ghods M (2022) A 10-year retrospective before-and-after study of lipedema surgery: patient-reported lipedema-associated symptom improvement after multistage liposuction. *Plast Reconstr Surg* 149(3): 529e–541e

Lipoedema UK. *Creating Change Together*. Available online: lipoedema.co.uk

Lipedema Foundation (2022) *Learning By Listening: Early findings from the Lipedema Foundation Registry Survey*. Available online: lipedema.org/lfr-report

National Institute for Health and Care Excellence (2022) *Liposuction for chronic lipoedema*. Available online: www.nice.org.uk/guidance/ipg721

Okhovat JP, Alavi A (2014) Lipedema: a review of the literature. *Int J Low Extrem Wounds* 14(3): 262–7

Ricolfi L, Reverdito V, Gabriele G, et al (2024) Micromassage compression leggings associated with physical exercise: pilot study and example of evaluation of the clinical and instrumental effectiveness of conservative treatment in lipedema. *Life* 14(7): 854

Williams A (2018) Understanding the challenges of lipoedema. *J Community Nurs* 32(2): 34–41

Wright T, Babula M, Schwartz J, et al (2023) Lipedema reduction surgery improves pain, mobility, physical function and quality of life: case series report. *Plast Reconstr Surg Glob Open* 11(11): e5436

Wounds UK (2017) *Best Practice Guidelines: The Management of Lipoedema*. Wounds UK, London. Available online: www.wounds-uk.com

Wu W-T, Hong C-Z, Chou L-W (2015) The kinesio taping method for myofascial pain control. *Evid Based Complement Alternat Med* 2015: 950519

Managing frailty, sarcopenia and malnutrition

Here, Dr Anne Holdoway, malnutrition pathway clinical director and consultant dietitian, looks at a recently launched online resource, 'A Guide to Managing Frailty, Sarcopenia and Malnutrition', to help healthcare professionals in managing the overlapping syndromes of frailty, sarcopenia and malnutrition, which are often wrongly considered to be an inevitable part of ageing. This new resource outlines considerations for protein consumption while also highlighting the importance of exercise to enhance muscle synthesis and strength. In addition, other areas of consideration include vitamin D supplementation, hydration, medicines management, social support, cognitive function, comorbidity optimisation, and falls and fragility fracture prevention.

An estimated 1.8 million people in the UK aged 60 and over are living with frailty (National Institute of Health Research [NIHR], 2017). Frailty and its consequences not only have a negative impact on an individual's well-being and quality of life, but also create significant pressures on health and care services through the additional support required by individuals affected. At an estimated annual cost of £5.8 billion, frailty places a significant burden on the NHS budget (NHS Confederation, 2024). As people live longer, often with multiple chronic conditions, the prevalence of frailty is expected to rise (Kingston et al, 2018). Not surprisingly, frailty is one of the current NHS priorities (NHS England, 2019), driven by the need to manage costs and also help individuals live an independent life, in as good a health state as is possible.

Early intervention is key to preventing and treating frailty. In response to the changing healthcare landscape and the need to address malnutrition and sarcopenia, which are key factors contributing to frailty risk, the Malnutrition Pathway has teamed up with consultant geriatrician, Dr Sanjay Suman, to develop a new, free online resource to help nurses recognise the signs of frailty and its overlapping syndromes — sarcopenia and malnutrition (www.malnutritionpathway.co.uk/frailty_guide). This is complemented by a free patient and carer information leaflet on frailty and its impact, along with helpful tips for individuals (www.malnutritionpathway.co.uk/library/frailty_patient_leaflet.pdf). This article summarises and highlights key components of the new online resource.

'As people live longer, often with multiple chronic conditions, the prevalence of frailty is expected to rise (Kingston et al, 2018). Not surprisingly, frailty is one of the current NHS priorities…'

WHAT IS FRAILTY

Frailty, a state of heightened vulnerability due to declining physiological reserves, significantly impacts health and well-being, particularly in older adults. The subsequent reduced capacity to cope with stressors increases the risk of falls, fractures, disability, hospitalisation, and premature death (Turner, 2014; Kojima et al, 2019) (*Figure 1*).

While often associated with ageing, frailty can also affect younger individuals with chronic illnesses, such as chronic obstructive pulmonary disease (COPD), cancer, and inflammatory bowel disease (IBD). Crucially, nutrition plays a pivotal role in both the development and management of frailty, particularly in relation to the prevention of sarcopenia (muscle loss) and preservation of muscle strength.

KEY CHARACTERISTICS OF FRAILTY

Frailty is typically defined by the presence of three or more of the following:

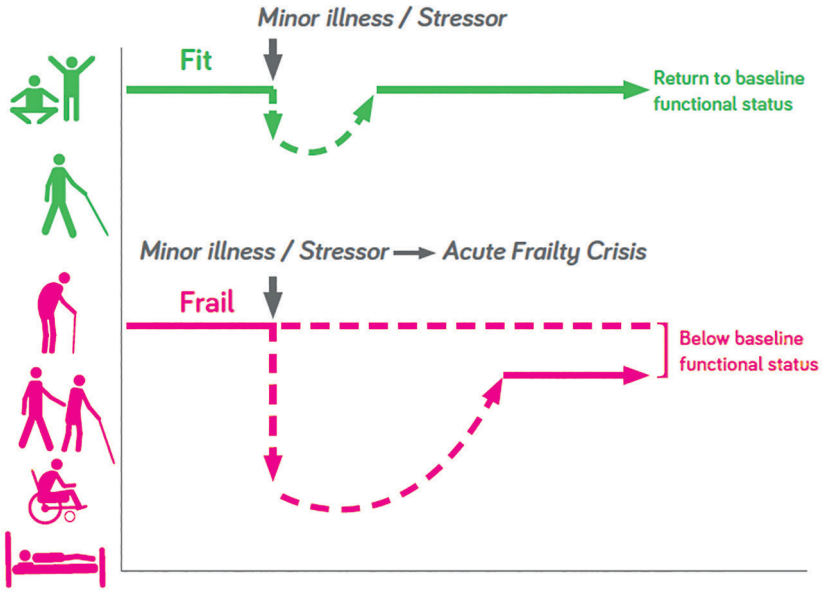


Figure 1.
Conceptual model of frailty.

- Unintentional weight loss: loss of five or more kilograms within a year without actively trying, or a significant decrease in appetite as a key nutritional indicator
- Exhaustion (fatigue): persistent feelings of tiredness and low energy, often linked to inadequate nutrient intake
- Muscle weakness (loss of strength): reduced muscle mass and strength, which can be measured by hand-grip dynamometry and directly impacted by protein and overall nutrition
- Slow walking speed: a noticeable decrease in walking pace, often related to muscle weakness and reduced energy availability
- Low physical activity level: infrequent or minimal moderate-intensity physical activity, which can further exacerbate muscle loss especially if nutritional needs are not met

(adapted from Fried et al, 2001).

INTERPLAY OF FRAILTY, SARCOPENIA AND MALNUTRITION — A NUTRITIONAL PERSPECTIVE

Frailty, sarcopenia and malnutrition are interconnected, with nutrition acting as a central link (*Figure 2*).

Malnutrition is often underdiagnosed and undertreated,

Practice point

- Sarcopenia: age-related loss of muscle mass and function. While inactivity and disease contribute, inadequate protein and overall calorie intake are major drivers. Malnutrition significantly increases the risk and severity of sarcopenia (Verlaan et al, 2017).
- Malnutrition: deficiencies, excesses, or imbalances in nutrient intake. It directly impacts muscle health, energy levels, and overall physiological function, contributing to frailty. Frailty itself can also lead to malnutrition due to reduced appetite, difficulty with food preparation, and social isolation.

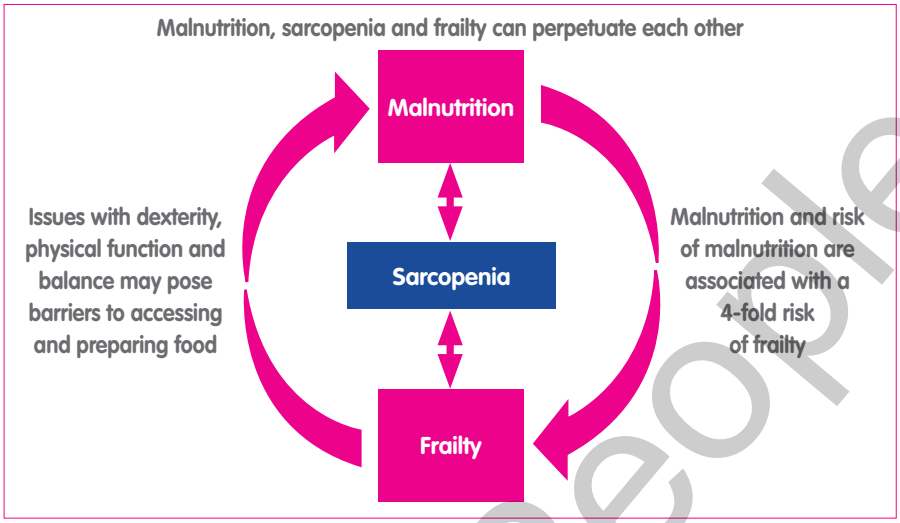


Figure 2.
Frailty malnutrition carousel.

'Malnutrition is often underdiagnosed and undertreated, mistakenly attributed to normal ageing or disease. Addressing malnutrition is paramount in frailty management.'

mistakenly attributed to normal ageing or disease. Addressing malnutrition is paramount in frailty management. Malnutrition can be identified through the use of validated screening tools such as the Malnutrition Universal Screening Tool ('MUST') (Elia, 2003), but key indicators include unplanned weight loss and poor dietary intake arising from reduced appetite, loss of interest in food, difficulties with eating and drinking, or limited access to food or preparation abilities. It is crucial to recognise that malnutrition and sarcopenia can occur even in overweight or obese individuals, masked by a high body mass index (BMI) (Batsis and Villareal, 2018).

IDENTIFICATION

Identifying frailty

Standard frailty assessment tools like the Fried Frailty Phenotype (FFP), Clinical Frailty Scale (CFS), and Electronic Frailty Index (eFI) are used. However, it is essential to integrate nutritional screening into these assessments.

Identifying sarcopenia

Standard methods like the SARC-F questionnaire and functional assessments (hand-grip strength, chair stand test) are used. These should be complemented by dietary assessment to understand protein and calorie intake.

Identifying malnutrition

In the UK, the Malnutrition Universal Screening Tool ('MUST') (Elia, 2003) is most commonly recommended due to its validation in both primary and secondary healthcare settings. 'MUST' combines scores for BMI, recent weight loss including time period the weight is lost, and the effect of acute illness to calculate risk of malnutrition. In those in whom risk is identified, a more detailed dietary assessment should follow, including:

- Dietary history: assessing usual food intake, eating patterns and any recent changes
- Appetite and taste changes: identifying any factors affecting food intake
- Swallowing difficulties: assessing for dysphagia, which can significantly impact nutritional status
- Access to food and meal preparation: evaluating social and environmental factors affecting food intake.

MANAGEMENT STRATEGIES

Effective management requires a multifaceted, person-centred approach with a strong emphasis on nutrition and physical activity.

Nutritional interventions

Interventions to optimise a person's nutritional status involve the following.

Prioritising protein intake

Adequate protein is paramount for the continuous synthesis of muscle and maintenance of muscle mass. It is now widely acknowledged in the scientific nutrition community that higher intakes of protein (1.2–1.5g/kg body weight per day) are required in older adults, those with illness or chronic conditions, and in those with frailty or sarcopenia, as compared to a healthy younger population (who require 0.8 grams of protein per kg ideal body weight per day) (Bauer et al, 2013; Deutz et al, 2014). Distributing protein intake across the day with a protein intake of 25–30g per meal is considered crucial for optimal muscle protein synthesis (Bauer et al, 2013; Deutz and Wolfe, 2013; Luiking et al, 2014; Mamerow et al, 2014; Paddon-Jones and Leidy, 2014). Good sources include lean meats, poultry, fish, eggs, dairy, legumes, nuts, and seeds.

Optimising calorie intake

Sufficient energy intake is needed to support metabolic needs and prevent further weight loss. This may involve increasing portion sizes of higher calorie or higher protein foods to make the meal nutrient dense, adding nutritious snacks, or using energy-dense foods.

Oral nutritional supplements (ONS)

When dietary intake is insufficient, ONS can provide concentrated sources of protein, energy, vitamins, and minerals. High-protein ONS, often fortified with leucine or beta-hydroxy-beta-methylbutyrate (HMB), can be particularly beneficial for combating sarcopenia (Nissen and Abumrad, 1997; Eley et al, 2008; Wilkinson et al, 2013; Cramer et al, 2016; Deutz et al, 2016; Ekinci et al, 2016; Sanz Paris et al, 2018). Dietitians are specifically skilled in matching ONS to address the dietary deficit and provide tailored recommendations on ONS types and dosages. Dietitians should be involved where available, including utilising their skills to advise on suitable policies to provide training and guide the prescribing of ONS by other members of the healthcare team (Gibbs et al, 2019).

Practice point

If ONS are prescribed, these may be providing a significant contribution to vitamin and mineral intake in addition to protein and calories and therefore supplemental vitamins and minerals may not be needed.

'High-protein ONS, often fortified with leucine or beta-hydroxy-beta-methylbutyrate (HMB), can be particularly beneficial for combating sarcopenia.'

Micronutrient optimisation

Addressing deficiencies in key micronutrients, such as vitamin D (important for muscle function and bone health), vitamin B12, folate, and iron, is also crucial for metabolism and function. Targeted supplementation may be necessary in the case of a deficiency, or where the diet is insufficient, a one-a-day multivitamin and mineral supplement may be recommended (National Institute for Health and Care Excellence [NICE], 2006).

Addressing eating difficulties

Providing support and strategies for individuals with swallowing difficulties, poor appetite, or difficulties with food preparation can help to optimise intake from food. This may necessitate texture-modified diets, meal-time assistive devices, e.g. modified cutlery, or meal delivery services or attendance at dining clubs.

Hydration

Ensuring adequate fluid intake is also important for overall health, falls prevention and fatigue management.

Exercise and physical activity

Regular physical activity, especially resistance training, complements nutritional interventions by stimulating muscle protein synthesis and improving muscle strength and function (Deutz et al, 2014; 2016). Advice should take into account the physical capability of the individual.

Other important components of intervention strategies

The following are other strategies that can be considered.

Medication review

Regular reviews are crucial to assess the merit of continued use of medications, especially in the cases of polypharmacy, and to identify and address potential drug interactions and side-effects that might be adversely impacting on appetite, nutrient absorption, and overall nutritional status, and that might necessitate discontinuation of a drug or a switch to a more suitable alternative.

Falls prevention strategies

Actions to improve balance and prevent falls can be instrumental in preserving independence and quality of life. Addressing muscle strength, nutritional deficiencies, hydration and rational use of medications can contribute to improved balance and reduced risk of falls.

Social support

Addressing social isolation and loneliness through dining clubs and eating with others for example, can facilitate social interactions and improve mealtime enjoyment and food intake.

Management of comorbidities

Optimising the management of existing medical conditions, including dietary management, can improve overall health and nutritional status.

A HOLISTIC AND PERSON-CENTRED APPROACH

The Comprehensive Geriatric Assessment (CGA) (British Geriatric Society [BGS], 2019) remains a valuable framework in undertaking holistic assessment and guiding care that is tailored to individual needs, preferences, and goals. Nutrition should feature as a key component, with involvement from a dietitian to

develop personalised nutrition plans where needed.

IN SUMMARY

Frailty is not an inevitable part of ageing, and nutrition plays a crucial role in its prevention and management. Proactive identification and management of malnutrition and sarcopenia are critical components of a comprehensive frailty management strategy. A person-centred approach, with a strong emphasis on optimising nutritional intake, combined with appropriate exercise and interventions focused on medication optimisation, social integration and cognitive function, are essential for achieving positive outcomes and improving the quality of life for individuals living with frailty. JCN

The Malnutrition Pathway frailty resources have been produced thanks to an unrestricted educational grant from Abbott.

REFERENCES

Batsis JA, Villareal DT (2018) Sarcopenic obesity in older adults: aetiology, epidemiology and treatment strategies. *Nat Rev Endocrinol* 14(9): 513–37

Bauer J, Biolo G, Cederholm T, et al (2013) Evidence-based recommendations for optimal dietary protein intake in older people: a position paper from the PROT-AGE Study Group. *J Am Med Dir Assoc* 14(8): 542–59

British Geriatric Society (2019) *Comprehensive Geriatric Assessment Toolkit for Primary Care Practitioners*. Available online: www.bgs.org.uk/cgatoolkit

Cramer JT, Cruz-Jentoft AJ, Landi F, et al (2016) Impacts of high-protein oral nutritional supplements among malnourished men and women with sarcopenia: a multicenter, randomized, double-blinded, controlled trial. *J Am Med Dir Assoc* 17(11): 1044–55

Deutz NE, Wolfe RR (2013) Is there a maximal anabolic response to protein intake with a meal? *Clin Nutr* 32(2): 309–13

Deutz NE, Bauer JM, Barrazzoni R, et al (2014) Protein intake and exercise for optimal muscle function with aging: Recommendations from the ESPEN Expert Group. *Clin Nutr* 33(6): 929–36

Deutz NE, Matheson EM, Matarese LE, et al (2016) Readmission and mortality in malnourished, older, hospitalized adults treated with a specialized oral nutritional supplement: A randomized clinical trial. *Clin Nutr* 35(1): 18–26

Ekinci O, Yanik S, Terzioglu Bebitoflu B, et al (2016) Effect of calcium ß-hydroxy-ß-methylbutyrate (cahmb), vitamin d, and protein supplementation on postoperative immobilization in malnourished older adult patients with hip fracture: a randomized controlled study. *Nutr Clin Pract* 31(6): 829–35

Eley HL, Russell ST, Tisdale MJ (2008) Mechanism of attenuation of muscle protein degradation induced by tumor necrosis factor-alpha and angiotensin II by beta-hydroxy-beta-methylbutyrate. *Am J Physiol Endocrinol Metab* 295(6): E1417–26

Elia M, editor (2003) *The 'MUST' report. Nutritional screening for adults: a multidisciplinary responsibility*. BAPEN, Redditch, UK

Fried L, Tangen CM, Walston J, et al (2001) Frailty in older adults: evidence for a phenotype. *J Gerontol* 56A(3): M146–56

Gibbs M, Drey N, Baldwin C (2019) Oral nutrition support interventions for patients who are malnourished or at risk of malnutrition: a survey of clinical practice amongst UK dietitians. *J Hum Nutr Diet* 32: 108–18

Kingston A, Robinson L, Booth H, et al (2018) Projections of multi-morbidity in the older population in England to 2035: estimates from the Population Ageing and Care Simulation (PACSim) model. *Age Ageing* 47(3): 374–80

Kojima G, Liljas AEM, Iliffe S (2019) Frailty syndrome: implications and challenges for health care policy. *Risk Manag Healthc Policy* 12: 23–30

Luiking YC, Deutz NEP, Memelink RG, et al (2014) Postprandial muscle protein synthesis is higher after a high whey protein, leucine-enriched supplement than after a dairy-like product in healthy older people: a randomized controlled trial. *Nutr J* 13: 9

Mamerow MM, Mettler JA, English KL, et al (2014) Dietary protein distribution positively influences 24-h muscle protein synthesis in healthy adults. *J Nutr* 144(6): 876–80

National Institute of Health Research (2017) *Comprehensive Care: Older People Living with Frailty in Hospitals*. NIHR. Available online: https://evidence.nihr.ac.uk/collection/comprehensive-care-older-people-with-frailty-in-hospital/

NHS Confederation (2024) *Supporting People with Frailty*. Available online: www.nhsconfed.org/publications/supporting-people-frailty

NHS England (2019) *NHS Long Term Plan*. Available online: www.longtermplan.nhs.uk/wp-content/uploads/2019/08/nhs-long-term-plan-version-1.2.pdf

National Institute for Health and Care Excellence (2006) *Nutrition support in adults: oral nutrition support, enteral tube feeding and parenteral nutrition*. Clinical Guideline 32. NICE, London. Available online: www.nice.org.uk/guidance/cg32

Nissen SL, Abumrad NN (1997) Nutritional role of the leucine metabolite ß-hydroxy ß-methylbutyrate (HMB). *J Nutr Biochem* 8: 300–11

Paddon-Jones D, Leidy H (2014) Dietary protein and muscle in older persons. *Curr Opin Clin Nutr Metab Care* 17(1): 5–11

Sanz Paris A, Camprubi-Robbes M, Lopez-Pedrosa JM, et al (2018) Role of oral nutritional supplements enriched with ß-hydroxy-ß-methylbutyrate in maintaining muscle function and improving clinical outcomes in various clinical settings. *J Nutr Health Aging* 22(6): 664–75

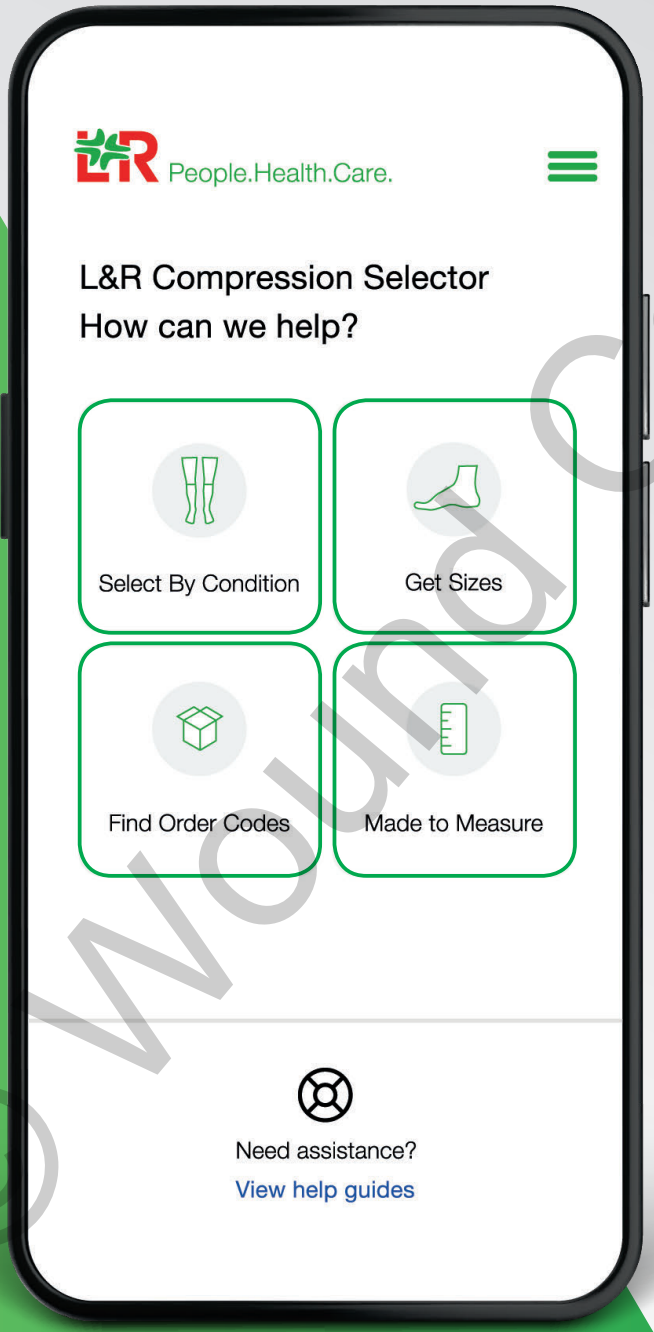
Turner G (2014) *Introduction to Frailty, Fit for Frailty Part 1*. British Geriatrics Society. Available online: www.bgs.org.uk/resources/introduction-to-frailty

Verlaan S, Ligthart-Melis G, Wijers SLJ, et al (2017) High prevalence of physical frailty among community-dwelling malnourished older adults-a systematic review and meta-analysis. *J Am Med Dir Assoc* 18(5): 374–82

Wilkinson DJ, Hossain T, Hill DS, et al (2013) Effects of leucine and its metabolite ß-hydroxy-ß-methylbutyrate on human skeletal muscle protein metabolism. *J Physiol* 591(11): 2911–23

People.Health.Care.

Search, Size, Send with our Compression Selector App



Simplifying Compression Selection

Supports Compression Selection

With our easy-to-use app, selecting the right compression has never been easier.

Supports Clinical Choice

Our compression selector app takes the guesswork out of selecting suitable compression for your patient. It quickly and effectively suggests the best fit for your patient's needs.

Supports Patient Care

By selecting the appropriate compression garment for your patient's condition, our app helps support patient care.

Scan the QR code to download the app

Available on the App Store

Available on the Google Play