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Managing ulceration and lymphorrhea in chronic oedema

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The rising prevalence of elderly and lifestyle-related chronic illness means chronic oedema and lymphoedema are likely to be encountered by many practitioners. They are caused and/or compounded by many increasingly prevalent chronic conditions, e.g. cancer, stroke, arthritis and chronic venous disease. Obesity and sedentary lifestyles also seriously impact on the development and progression of chronic oedema and lymphoedema. The sequellae of untreated chronic oedema include increased swelling, chronic inflammation, skin changes, superficial ulceration, and lymphorrhoea. The ultimate aim of management is to achieve self-care, either completely or supported by family or carers, and this requires tailoring the treatment to the individual patients' circumstances. Self-care also requires addressing the compounding lifestyle factors to prevent successful outcomes from being short term or unlikely (Todd, 2014). Nurses now have a greater range of tools to manage chronic oedema and lymphorrhoea, and by using a case-study methodology, this article will demonstrate the effectiveness of two of these tools, namely the Velcro wrap compression system (WCS) (JOBST FarrowWrap) and absorbent wound products (Cutimed Sorbion).

ABSTRACT

This clinical review article on the combined use of Jobst FarrowWrap and Cutimed Sorbion uses a case study methodology to demonstrate how effective this approach is in managing superficial ulceration and/or lymphorrhea in the presence of chronic oedema and lymphoedema. The blend of these symptoms causes significant physical and psychosocial issues for patients and is highly labour and resource intensive. However, there is often inadequate treatment choice leading to protracted input by nurses and delayed or failed healing. Only by combining effective exudate/lymphorrhoea dressing choice with compression therapy, will there be a positive outcome and this will result in reducing nursing input, cost to the NHS, and enhance patient self-care.

KEY WORDS

◆ lymphoedema ◆ chronic oedema ◆ ulceration ◆ lymphorrhoea ◆ compression wraps ◆ exudate

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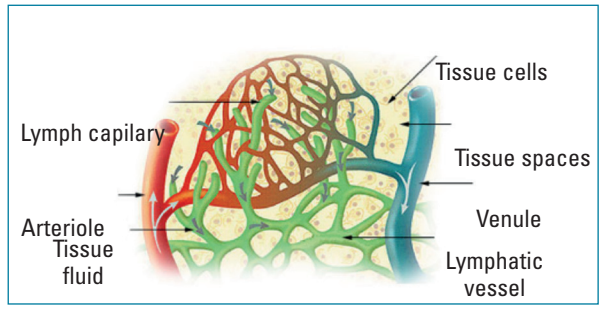

Figure 1. Relationship between the arterial, venous, and lymphatic system in the interstitium showing all the interstitial fluid being absorbed by the initial lymphatics

The interstitial circulatory system comprises arterioles, venules, and lymphatics. Oxygen and nutrients are delivered to the tissue cells via the arterial system and the waste products are removed by the venous system. The initial lymphatics absorb the tissue fluid and once filtered through the nodes, this fluid is returned to the venous system either at the right or left subclavian veins. It was initially understood that 90% of the tissue fluid entered the veins, leaving the lymphatics to mop up the remaining 10%, but it is now known that all the fluid is absorbed by the lymphatics (Mortimer and Rockson, 2014).

The three main functions of the lymphatics are:

- Fluid homeostasis by returning interstitial fluid to the venous system
- Immunity homeostasis by fighting infection
- Fat homeostasis by absorbing fats from the gut and mobilising peripheral fat when required (Mortimer and Rockson, 2014).

Damage to the lymphatic system may result in the development of lymphoedema (Mortimer and Rockson, 2014). Lymphoedema is a form of chronic oedema where the main cause is the treatment of cancer (surgery or radiotherapy), but other surgical procedures may necessitate the removal of lymphatic tissue, e.g. in the management of necrotising fasciitis. The area of swelling will depend on the area affected, e.g. axillary node dissection in breast cancer can result in corresponding arm swelling. In primary lymphoedema there is a congenital developmental fault in the lymphatics, which can be genetic (Connell et

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Table 1. ISL (2013) staging of lymphoedema

	Presentation	Severity	Management
Stage 0 (latent sub-clinical stage)	No overt swelling but lymphatic pathways have been disrupted		
Stage 1 (early stage)	Mild pitting oedema that resolves with elevation	Mild – <20% increase in excess limb volume	Compression hosiery, exercise, simple- or self-lymphatic drainage, preventative skin care
Stage 2	Swelling does not resolve with elevation. Less evidence of pitting as fibrosis development occurs	Moderate – 20-40% increase in excess limb volume	Custom-made hosiery/ compression bandaging, exercise, self-/manual lymphatic drainage, skin care
Stage 3 (late stage)	Non-pitting with skin changes (papillomata, fibrosis, hyperkeratosis).	Severe – > 40% increase in excess limb volume	Compression bandaging, skin care, exercise, manual lymphatic drainage

Table 2. Skin changes in chronic oedema

Hyperkeratosis	Thickening of the stratum corneum causing thick waxy scaly skin, which varies in colour from yellow to brown. Can be treated with regular washing and moisturising the skin, exfoliating products, or hydrocolloid dressings in severe cases
Papillomatosis	Intitial lymphatics protruding through the skin surface. Compression bandaging can reduce these
Fibrosis	Thickening and hardening of the subcutaneous tissues caused by the inflammatory process in venous and lymphatic disease. Compression bandaging can reduce this process in most cases
Exaggerated skin folds	Caused by overstretching of skin by oedema. Main areas are the ankles and toes but may also be present mid-calf and around the knee, or the wrist in arm swelling. Some compression hosiery can tourniquet here causing discomfort and breaks in the skin. There is also a higher risk of fungal infection in these areas. Regular washing and drying between the folds will reduce the risk of skin breakdown and fungal infection. Reducing the volume of oedema can reduce the skin folds

al 2013). This can result in the presence of swelling at birth or it can be dormant for many years and develop later in life. The fluid output into the interstitium is normal but lymphatic uptake is reduced.

Chronic oedema results when there is no pathological fault in the lymphatics but other factors cause swelling, e.g. chronic venous disease, prolonged dependency of the limbs, obesity, and chronic organ failure (cardiac, renal). It usually affects the legs. In these cases the output into the interstitium exceeds the uptake capacity of the lymphatics.

Both lymphoedema and chronic oedema can have a devastating physical and psychosocial effect on both the patients and their families. The extra weight of the swollen limb(s) can affect gait, mobility, and cause pain in surrounding joints and muscles. There is often difficulty with clothing and footwear, and this causes body image and social issues. Many find it difficult to maintain their current employment or find alternatives and this can lead to, or exacerbate, sedentary lifestyles (Moffatt et al, 2003). Skin changes (*Table 2)* are more prevalent in chronic oedema (Todd et al, 2017), mainly in the lower legs but can also be present in the upper legs and on a pendulous apron in the morbidly obese. Patients relate skin changes with being dirty (Todd, 2013), and there is often superficial ulceration that requires resource-intensive input in terms of nursing time and wound management products. Unfortunately this input is often prolonged over many months or years because of inadequate management strategies (poor wound care choice and lack of compression) and poor patient concordance.

Lymphorrhoea (lymph fluid exudating onto the surface of the skin) accompanies wound exudate in ulceration and results in wet clothing, footwear, and bedding. It can also be present in lymphoedema following minor trauma to the lymphoedematous area, especially in vulnerable skin of the elderly or palliative patients (Board and Anderson, 2013). In isolation, it appears as straw coloured watery fluid but in the presence of wound exudate, its colour and consistency will be dictated by the exudate. It is more common in the lower legs, especially if prolonged dependency is an issue, but other areas can be affected, e.g. in a lymphoedematous arm. If left unmanaged, lymphorrhoea can cause moisture-related skin damage (maceration), which can lead to more widespread ulceration, especially if there is chronic wound exudate present. Exudate from chronic wounds is known to be destructive to the wound bed because of a high concentration of proteases and diminished growth factors (Vowden, 2011).

In chronic oedema and lymphoedema there is a risk of cellulitis (Cooper, 2016) but this risk is increased if the

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Table 3. Management of chronic oedema and lymphoedema

	Aim of approach	Strategies involved
Lymphoedema self-care approach	If there is mild swelling and no skin changes. Aim is to prevent increase in swelling and development of skin changes	Compression garment and/or wrap compression system (WCS), skin care, exercise, lifestyle advice, and simple/ self-lymphatic massage (SLD)
Lymphoedema intensive approach	When there is significant swelling, skin changes, or lymphorrhoea. Aim is to reduce swelling, reverse skin changes, and stop lymphorrhoea	Compression bandaging or WCS, skin care, exercise, lifestyle advice, manual lymphatic drainage (MLD). Carried out by lymphoedema specialist
Chronic oedema self-care approach	Mild to moderate swelling, no ulceration. Aim is to prevent increase in swelling and development of skin changes	Compression hosiery and/or WCS, skin care, exercise, and lifestyle advice.
Chronic oedema intensive approach	Severe swelling with skin changes/ulceration. Aim is to heal the ulceration/reverse skin changes and reduce the swelling.	Compression bandaging or WCS, wound care products/ skin care, exercise, lifestyle advice. Carried out by community nurses with possible advice and support from lymphoedema specialist.

integrity of the skin is compromised, e.g. ulceration and lymphorrhoea.

Management of chronic oedema and lymphoedema should ultimately lead to self-care (Todd, 2013a). While there are differences in these two conditions, there are some similarities in their management (*Table 3*).

Compression aids the impaired lymphatic and venous drainage by:

- Augmenting the calf muscle's natural pumping activity
- Preventing venous backflow
- Reducing capillary filtration and increasing interstitial pressure which leads to greater absorption of fluid by lymphatics
- Stimulation of lymphatic contraction.
- Breaking down fibrosed tissue and enhancing the flow of nutrients to the skin, which improves healing (Partsch and Junger, 2006).

There are various ways that compression therapy can be delivered it but must be based on an holistic assessment and the patient's individual circumstances. Guidance on which type of compression product to use is given in *Table 3*, but practitioners must note that there may be instances when an alternative approach is required, for example, compression hosiery is indicated but if there are strength or dexterity issues a WCS may be more appropriate. Similarly, if bandaging is indicated but access to specialist nurses is difficult the WCS is a viable alternative. Other indications for use are for those who are unable to bend or reach the lower legs because of, for example, back problems, obesity, and older age (Lawrance, 2008), or if the patient has fragile skin and applying compression stockings may cause damage. The WCS is made of inelastic fabric that wraps around the limb and is secured with Velcro straps (Williams, 2016). It is adjustable, allowing patients to manage fluctuating oedema themselves and subsequently giving them the power to control their self-care. Cost savings can be achieved with the WCS compared to the cost of bandaging materials, with subsequent reduced time involved for professionals and patients due to quicker and easier application of the device (Williams, 2016).

Most lymphoedema specialists favour an inelastic, short-stretch compression system (Partsch, 2007) and the WCS provides this. Inelastic 'intelligent bandaging systems' applied at full stretch will form a rigid cast around the limb, delivering high working pressures creating the pulse effect during muscle contraction, while providing tolerable lower pressures during rest, making them more comfortable and improving compliance (Partsch et al, 2008). This makes short-stretch compression effective in the treatment of lymphoedema, chronic oedema, and chronic venous insufficiency.

Management of lymphorrhoea

Lymphorrhoea presents some significant challenges for both patients and the health professionals. It is important to initiate treatment immediately to prevent further breakdown of the skin and increase the risk of cellulitis. Appropriate dressing selection should be non-adherent, absorbent, and prevent maceration of the skin (Wounds UK, 2012). Frequency of dressing change will be dictated by the volume of lymphorrhoea and initially this may be daily. However, compression must be included in the treatment strategy, otherwise the process will be protracted and probably unsuccessful, especially if there is also ulceration present. There is anecdotal evidence of patients receiving wound management care for many years without success because compression is not included, it is likely that this represents an immense cost to the NHS.

Cutimed Sorbion is a super-absorbent dressing suitable for almost all types of moderate to highly exudating wounds and lymphorrhoea. The dressing uses Hydration Response Technology; a fibre matrix with gel polymers encased in an outer sachet that is sealed ultrasonically, providing state-of-the-art exudate and lymphorrhoea management and wound-bed preparation, creating the ideal moist wound healing environment. It is available as Sachet S (for moderate to high exudate levels), Sachet Extra (for very high levels) and Sachet XL (for large, difficult-to-dress wounds), and all are effective under compression. Used in combination with the JOBST FarrowWrap, can provide the ideal conditions for oedema reduction, exudate and lymphorrhoea control, and wound healing. The super

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absorbency reduces the need for more frequent dressing and bandage changes, and limits maceration of the skin. This in turn cuts down on nurses visits, reducing overall costs and increasing patient freedom (Williams, 2016).

Case studies

The Leg Ulcer Clinic situated in St Albans City Hospital, was established in 2006, primarily as an assessment and treatment service for patients with venous or mixed arterial venous ulceration and for those with chronic oedemas and non-cancer related lymphoedema. The service is only for West Hertfordshire and forms part of the wider leg ulcer service that covers East and North Hertfordshire. The clinic is staffed by two nurses – a Leg Ulcer Specialist Nurse and a Leg Ulcer Support Nurse who are trained in both leg ulcer and oedema management and run the clinic full time 5 days a week.

The following case studies are examples of the use of FarrowWrap and FarrowWrap Lite on 4 patients from our caseload.

Patient 1 Mrs F

Mrs F was referred to the service by her GP with a long-standing history of bilateral lower leg lymphoedema of many years' duration. The lady has previously tried multiple different makes of hosiery but struggled with application and removal even with the assistance of her husband. This was compounded by her obesity and large girth with presenting BMI of 40.8. Mrs F has found weight loss difficult despite input from the dietetic service at several points over the last years. Of note, in her medical history, she has type 2 diabetes mellitus and chronic kidney disease. The GP also reported recurrent episodes of cellulitis.

On examination Mrs F had bilateral non pitting oedema below the knee with induration and papillomatosis. The skin was stretched, fragile and shiny. Stemmer's signs negative. There were currently no wounds to either limb or varicose eczema which had apparently troubled her in the past. Toes and feet were well kept with no signs of fungal infection and web spaces between the toes were clean and dry. Pulses were uncompressible on Doppler ABPI/TBPI but were audible with a handheld Doppler and triphasic.

Initial limb circumferences were recorded as right ankle 31cm; calf 47.5cm; left ankle 34cm; calf 47.5cm.

Mrs F was shown samples of the FarrowWrap and preferred the appearance of the FarrowWrap Lite. She also wore small, heeled, slip on shoes and wished to be able to continue to do this and therefore did not want to wear anything bulky over her feet and this was non-negotiable. Therefore, it was agreed that she would try the leg piece only.

We agreed initially to apply Actico short stretch bandaging for 2–3 weeks to improve the condition and shape of the limbs prior to fitting the FarrowWrap Lite. Once fitted, Mrs F's husband was able to help her with a daily skin care regime and removal and reapplication of the FarrowWrap Lite. He initially expressed some concern

Patient 1: Mrs F left leg prior to application of FarrowWrap (A), Mrs F right leg prior to application of FarrowWrap (B), Mrs F FarrowWrap insitu (C)

that he was applying them 'too tightly' although Mrs F found them comfortable, and there was no evidence of any marking to the legs. They continued to manage well with the FarrowWraps and reduction in limb circumferences and skin integrity were maintained. Mrs F expressed that she was happy with the FarrowWraps and was pleased that she could wear her usual footwear and they even managed to take a holiday and reported no problems whilst they were away.

Limb circumferences on completion of treatment: right ankle 30cm calf 44cm; left ankle 28cm; calf 44cm.

Patient 2 Mr T

Mr T is a current patient on our well leg caseload. He was referred to the service back in December 2012 with venous hypertension of both lower limbs and ulceration to the right medial malleolus. Being a younger patient, aged 53 at the time of initial presentation, Mr T was keen to self-care and be able to shower and was therefore treated with a Comfipression hosiery kit to give 40mmHg compression. Mr T managed very well with this and healed in January 2013. Mr T has a history of myocardial infarction 20 years ago and had an ICN fitted in 2010, although this has never been activated. He has also had multiple deep vein thromboses and a pulmonary embolism in 1997 for which he remains on warfarin.

Mr T was previously employed in the construction industry but had to retire early due to his ongoing health issues. As a result of this he subsequently became less active, which he attributes in part to his family being more protective and letting him undertake less tasks at home. He has struggled with weight issues and presented with a BMI of 39. He had been diligent with wearing hosiery but over the last year has found it more difficult due to back pain and increasing shortness of breath, and as a result of this stopped wearing his compression hosiery. He reported that the legs then became more oedematous quickly. He also found that his legs ached without wearing any form

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Patient 2: Mr T FarrowWrap insitu (A), Mr T following application of FarrowWrap (B)

of compression. He enjoys looking after his grandchildren and is keen to play an active a role in day-to-day family life as much as possible and was enthusiastic about finding an alternative to hosiery.

On examination there were multiple signs and symptoms associated with venous insufficiency including haemosiderin staining, ankle flare and atrophie blanche. Mr T also has prominent varicose veins. The skin to the legs was stretched, fragile and shiny but there were no wounds or eczema. Mr T reported that the legs became progressively more oedematous during the day. Doppler ABPI was undertaken and recorded as right ABPI 1.13 and left ABPI 1.11 with triphasic pulses.

Initial limb circumferences: right ankle 27cm; right calf 42cm; left ankle 28cm; left calf 40cm.

Following discussion, it was agreed to try the FarrowWrap Lite in the first instance as Mr T has some arterial risk factors and has only been tolerating class 2 hosiery. Mr T had no oedema of his feet and was keen to wear his usual trainers and it was agreed to try the leg piece only.

Mr T was shown how to apply the FarrowWrap Lite and was happy to try and manage to change it. On first review he reported some chaffing and there was some indentation to the skin. He reported that he did not find it as aesthetically pleasing as the hosiery, however he was appreciative of the fact that he could manage to change the FarrowWrap Lite whereas the hosiery he could not, even with the use of an applicator. He also felt better for wearing compression and is happy to persevere. We have discussed strategies such as not overstretching the FarrowWrap Lite when putting it on and adjusting it for comfort during the day. We will continue to monitor and may consider the use of FarrowWrap Classic at a later date if it is felt he requires an increased level of compression.

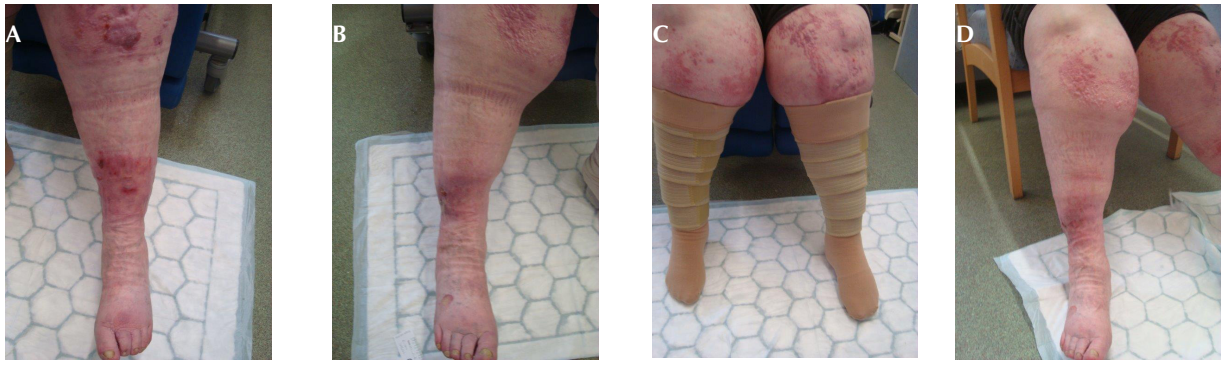
Patient 3 Miss W

Miss W has been on our leg ulcer caseload for a number of years with recurrent bilateral venous leg ulceration and cellulitis and lymphoedema since 2003. During episodes of healing she has been wearing class 2 made to measure Elvarex below knee, open toe compression hosiery. However, due to the shape of her legs the hosiery tends to cut in below her knees and slips down which causes increased oedema below the knees. The hosiery has also not been effective in preventing recurrence of her ulceration. Miss W is also obese (presenting BMI 41) and her large girth makes it difficult for her to bend to reach her toes to put her hosiery on. She was previously a full time carer for family members, a role which has now ceased, and as a result she had become less active and her level of motivation to become more mobile had declined. Miss W had an excision of an acoustic neuroma several years ago and has more recently developed likely bullous pemphigoid and is awaiting further dermatology review after declining a biopsy last year to confirm diagnosis. She tends to develop blistering around her thighs and on occasion to the gaiter area of her lower legs and dorsum's of the feet.

Miss W has had ulceration to both gaiter areas for several months, which have taken some time to progress towards healing. Her most recent Doppler was recorded as right ABPI 0.83, left ABPI 0.92, with triphasic pulses.

As the wounds to Miss W's legs were making good progress we decided to use the opportunity to discuss possible alternatives to her current hosiery, which may make self-care easier for her. Miss W was open to discussion and used the opportunity to state that she wished to make positive changes to her lifestyle to facilitate some weight loss. She has begun a programme in which healthy reduced calorie meals are delivered and has also started to spend less time sitting in the chair and using the opportunity to be more active in her garden.

Miss W did not want to have to change the dressings to her legs everyday. With this in mind it was decided to try



Patient 3: Miss W left leg prior to application of FarrowWrap (A), Miss W right leg prior to application of FarrowWrap (B), Miss W FarrowWrap insitu (C), Miss W right and left leg following application of FarrowWrap (D)

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Patient 4: Mr T left leg prior to application of FarrowWrap (A), Mr T right leg prior to application of FarrowWrap (B), Mr T sorbion dressing insitu (C), Mr T FarrowWrap insitu (D)

Flaminal hydrogel to facilitate debridement of the wounds under Atrauman with a Sorbion sachet to absorb exudate as the volume of exudate tends to fluctuate depending on Miss W's level of activity. She also sits with the legs dependant during the day, despite advice to the contrary, and this was also one of the reasons for selecting FarrowWrap Classic as it was felt that an increased level of compression would help complete and maintain healing. Coupled with her ongoing plans to address her weight issues, to date she has lost 2 stone in weight, which may impact on the circumferences of her lower limbs, it was felt that the FarrowWrap Classic strapping could be adjusted to fit and that she would be able to do this herself.

On initial review Miss W reported that she had managed to change the FarrowWrap Classic system, which she had done once in the week. There had not been the slippage that she usually experienced with the compression hosiery. The dressings had also contained the exudate and there had been no leakage or odour through the system, which she was pleased about as she did not have to change the dressing more than once. Miss W did not feel the FarrowWrap looked as nice as hosiery but could appreciate that the fit was improved. She is keen to try and maintain the positive changes she is making and with encouragement continues to wear the FarrowWrap and Sorbion combination and persist with her weight loss meal plan and heightened level of activity.

Patient 4 Mr J

Mr J presented with bilateral lymphoedema secondary to his obesity – presenting BMI 50. He had grossly oedematous lower legs including the feet and toes. There was constant leakage of lymphorrhea and he had large areas of excoriation of the skin. He had had multiple episodes of cellulitis as a result and had been unsuccessfully managed with both compression bandaging and hosiery. He had no medical history of note other than borderline type 2 diabetes mellitus, the monitoring of which is ongoing.

Mr J's main problem is that his obesity does not allow him to sit comfortably with his legs elevated and he does not go to bed at night. He has also been unable to change compression hosiery easily. He is at present resistant to intervention to address his underlying weight issues.

Mr J has a small holding and cares for his animals without any help and he is reluctant to explore any means of assistance with this. His animals are very important to him often to the detriment of his own health. He was keen to manage his lymphoedema and to become independent with compression garments and to spend less time travelling backwards and forwards to have his legs dressed. He also found that the bandages were too bulky and often slipped down, once causing a deep iatrogenic wound to the back of his knee which was very painful for him.

On examination Mr J had no signs or symptoms of venous or arterial insufficiency. Pulses were uncompressible on Doppler ABPI/TBPI but were audible with handheld Doppler and triphasic. There was minimal oedema of the feet and toes and as Mr J could not reach his feet it was decided to use the leg piece only in the first instance. Mr J was unsure which system he would manage easiest and has found class 2 hosiery difficult to tolerate in the past, therefore it was decided to try a FarrowWrap Lite to the left leg as this was the less oedematous of the two and a FarrowWrap Classic system to the right leg initially. In order to manage the exudate, Aquacel Ag extra was applied to the areas of excoriation with Sorbion sachet to cover.

Mr J initially had the dressings changed 2–3 times weekly. The left leg healed after 1 month of treatment and the areas of excoriation to the right leg considerably reduced. Mr J was able to adjust the FarrowWrap system although had not managed to change it independently but had found them more secure without the previous slippage he experienced and he was able to carry out his day to day activities more comfortably as he experienced much less pain and leakage and odour than before. It is hoped that in the longer term we will be able to support Mr J to address his weight issues and look at strategies to help him lose weight, which will facilitate his independence with managing the FarrowWraps.

Conclusions

The prevalence of chronic oedema and lymphoedema is increasing as the ageing population grows and lifestyle-choice-related chronic illness rises. Nurses need to be proactive in their management of these conditions and their probable sequellae, i.e., ulceration and lymphorrhoea.

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Jobst FarrowWrap used in combination with Cutimed Sorbion can reduce the time and cost of this management, and lead to greater compliance and self-care. **BJCN**

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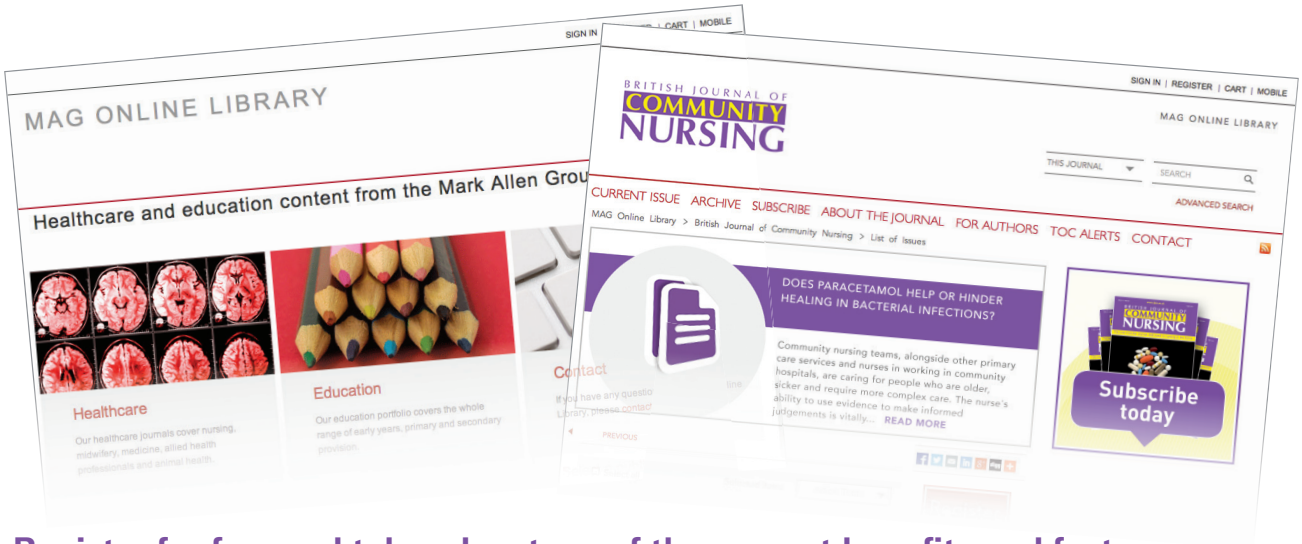

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