

# Tackling compression therapy in the community: a new solution for nurses

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The use of compression bandaging in venous leg ulcers has been acknowledged as 'best practice' for some time now, but these wounds remain a serious management problem in many patients with pain, excess exudate, limb swelling and poor mobility all affecting their quality of life. Wound care in general, and leg ulcer management specifically, are two of the most common reasons for referral to community nursing services and recent government policy aimed at managing more patients in primary care and in their own homes has also meant that nurses are now seeing more patients than ever before. All of this means that they need compression systems that are easy to apply and can deliver safe and consistent pressures to minimise risk and safeguard patients. This article presents the findings of a 40-patient multi-centre evaluation of a new inelastic compression bandage system (HERO H-2®; H&R Healthcare) designed to provide optimal compression levels, reduce odour and moisturise the skin. The evaluation demonstrated that the bandage system had a positive effect on a number of parameters including wound size, healing rates, patient comfort and mobility.

## KEYWORDS:

■ Wound care ■ Leg ulcers ■ Compression ■ Healing

Wound care is a speciality that has grown particularly challenging for clinicians in recent times, in part because of a massive rise in the number of treatment options available as well as advances in scientific diagnostic tools, both of which have made managing wounds a more complex business, particularly for non-specialist clinicians. However, there is one area in which best practice is fairly well established — leg ulcers.

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The use of compression bandaging in venous leg ulcers has been acknowledged as best practice for some time now (Anderson, 2011; National Institute for Health and Care Excellence [NICE, 2012]; O'Meara et al, 2012).

As these wounds affect a significant proportion of the population (up to 1% of all adults according to some estimates [Christian, 2013]) and are a serious management problem in many patients — causing pain, excess exudate, swelling and poor quality of life (Scottish Intercollegiate Guidelines Network [SIGN], 2010) — having a clearly identified treatment method represents a clear pathway for community nurses faced with ulceration on the lower limb.

As mentioned above, compression is regarded as best practice for venous leg ulceration

(Anderson, 2011) and a twin approach is usually recommended — initial treatment with a compression bandaging system to reduce any swelling caused by oedema in the limb (which will also help to reduce excess exudate), followed by continued lighter compression provided by compression hosiery — this helps to maintain the gains of compression bandaging once the ulcer has healed (SIGN, 2010).

## WHAT IS COMPRESSION THERAPY?

Compression is essentially the application of external pressure to the lower limb in order to facilitate the return of excess blood to the heart (Moffatt, 2007). It has a similar effect on excess fluid (oedema) that can collect in the tissues of the lower limb, partly as a result of chronic venous insufficiency (CVI). Therapeutic compression is measured in millimetres of mercury (mmHg) pressure, and the strength of its action against the blood in the veins and fluid in the tissues depends on the amount of pressure delivered.

This is also affected by the type of material used in the manufacturing process of the compression product and how it is applied, e.g. four-layer bandaging, two-layer bandaging, hosiery, etc (Moffatt, 2007).

## COMMUNITY LEG ULCER MANAGEMENT

### Services

Wound care in general, and leg ulcer management specifically, are two of the most common reasons for referral to community nursing services (Rubi et al, 2003). However, despite clear pathways demonstrating the initial treatment and management of venous ulcers, in reality, there are a number

of reasons why patients — and community nurses themselves — often find it difficult to access the correct treatment in the community. One is the variety of clinical settings providing leg ulcer/compression services, ranging from leg ulcer clinics, specialist tissue viability nurses and leg clubs (where compression therapy is offered in a more 'social' environment to encourage concordance) (SIGN, 2010).

Added to this are the various clinicians who are tasked with providing compression, many of whom, such as nursing home staff, community nurses themselves, and even carers and family members, may have learnt their compression skills from colleagues or had knowledge handed down from other staff (Flanagan, 2005).

This is not always a recipe for best practice however, with ritualistic practice often developing and leg ulcer care becoming task-oriented, rather than patient-focused — one study found that compression bandaging technique among community staff did not always adhere to best practice (Morgan and Moffatt, 2008; Chamanga, 2014).

This disparity in service provision can sometimes lead to confusion and patients falling 'between the cracks' and not receiving the correct leg ulcer management, despite the amount of clinicians and services available.

## Treatment

In the past few years there have been major leaps forward in leg ulcer treatments, with many new options in bandage technique, hosiery options and skin care (Probst, 2012; Ashby et al, 2014), and there are now a plethora of options available on the market, including two- and four-layer compression bandages, various hosiery options and different ranges of debridement and cleansing cloths for the removal of dead skin and slough.

While choice can be a good thing, it can also mean that community staff are often unsure of the best technique to use (Chamanga, 2014). In some cases this can be disastrous for the patient, with poor bandaging

technique causing constriction, pain and problems with leaking exudate, for example (Moffatt, 2004).

## Policy

Recent government policy aimed at managing more patients in primary care and in their own homes has also meant that community nurses are now seeing more patients than ever before, placing increased demands on their ability to provide treatment for those with leg ulcers (Department of Health [DH], 2009; Tinkler et al, 2014).

While wound care has always formed a large part of the community nurse's workload, these new directives mean that they will now be seeing a greater volume and variety of patients (more acute, post-surgical-type wounds, for example). This can only add to the community nurse's workload and make finding time for the complicated treatment involved in leg ulcer care even harder to achieve.

## Choice

All of the factors listed above serve to highlight the importance of having a bandage system that is easy to learn, easy to apply and has the ability to deliver safe and consistent applied pressures that minimise risk. As Thomas et al (2007) point out, community nurses now have a multitude of dressings to choose from, all of them designed to facilitate wound healing or improve the quality of

life of patients with intractable non-healing wounds.

However, when trying to decide which compression products to use, there are some key areas for community nurses to consider:

- ▶ Is it safe?
- ▶ Does it offer additional patient benefits and improve quality of life?
- ▶ Is it easy to use?
- ▶ Is it easy to teach/learn?
- ▶ Is it cost effective?
- ▶ Is it clinically effective and able to improve long-term patient outcome?

## Community application

The properties of HERO H-2 two-layer inelastic compression bandages (H&R Healthcare) (*Figure 1*) make them an ideal choice for patients who require a compression regimen in the community. Not only is the system low profile and comfortable for the patient to wear (being lightweight and non-bulky), it also resists 'slippage', reduces bandage odour (due to its cyclodextrin content) and moisturises the skin through its Aloe content, thus protecting the patient's skin from dryness between changes.

The bandage system is also easy to apply and can stay in place for up to a week which is a crucial factor for nurses who have busy caseloads and who need to feel confident that a bandage will remain effective between visits, while also being



Figure 1. Layers 1 and 2 of HERO H-2 compression bandaging system.

comfortable for the patient for the duration of wear.

## EVALUATION

Following the introduction of the HERO H-2 two-layer compression bandage system, Greaves et al (2014) reported positive patient and clinician feedback, concluding that the new compression bandage system was easy to learn, easy to apply and offered additional patient benefits such as skin moisturisation and odour-relieving properties. The authors suggested that this compression system has the potential to improve patient concordance with compression treatment.

Barrett (2015) conducted an experimental healthy volunteer evaluation to explore applied sub-bandage pressure values and the consistency of repeated applied sub-bandage pressure values, finding that the pressures exerted by the HERO H-2 bandaging system were in line with other two-layer bandage systems and deemed safe to use. Barrett (2015) also highlighted the potential for significant cost savings using the HERO H-2 system and proposed a larger evaluation to explore longer-term clinical outcomes, patient acceptability and wound closure.

### Aim

The aim of this latest evaluation was to explore the ease of implementation, patient benefits and associated wound outcomes of using the HERO H-2 bandage system in a wide variety of UK leg ulcer services.

### Method

Four UK community leg ulcer service providers were enlisted to participate in the evaluation. Governance approval was gained at each centre and the investigators included vascular nurse specialists, dermatologists, leg ulcer lead specialists, tissue viability nurse specialists, district nurses and practice nurses.

All of the participating centres used local protocols based upon best practice leg ulcer, compression and skin care guidelines. Before the

evaluation began, the clinical monitor visited the investigating clinicians to train them in the use of the HERO H-2 bandage system — this included a practical demonstration of how the system should be applied.

All 40 patients were community-based and living in their own homes. They presented with a variety of new or recurring leg ulcers of venous or mixed aetiology, all of which were chronic having been present for over six weeks before treatment — there was also a variety of comorbidities among the group.

All consent forms were witnessed by the clinical monitor but were retained by the lead investigator to protect patient anonymity.

An initial patient assessment was undertaken to include the following elements:

- ▶ Previous medical history
- ▶ Ulcer type
- ▶ Duration and any recurrence
- ▶ Age of wound
- ▶ Size of wound
- ▶ Whether Doppler assessment had been performed
- ▶ Skin condition
- ▶ Infection status
- ▶ Dressing regimen
- ▶ Previous compression used.

Data was collected on a weekly basis for six weeks, or until complete healing occurred. The evaluation was extended beyond the six-week period for those making positive progress and wishing to remain in the HERO

H-2 bandage system until complete healing occurred and hosiery was implemented.

Photographs were obtained at each weekly dressing change to evaluate any slippage, the skin's condition and any wound reduction. One photograph was taken before the removal of the HERO H-2 bandage, one of the exposed wound and the surrounding skin, and one when the new system had been re-applied.

The weekly dressing changes also aimed to capture the following information:

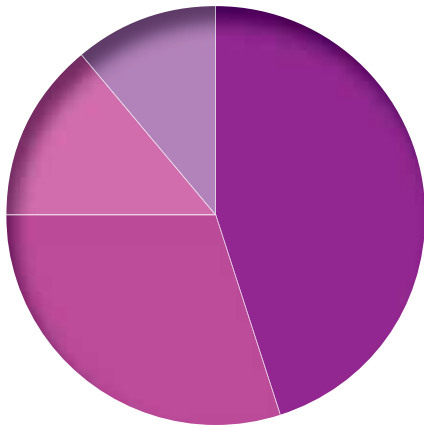
- ▶ Whether staff could be easily trained in the use of HERO H-2
- ▶ Ease of application
- ▶ Ease of removal
- ▶ Appearance when applied
- ▶ Appearance before removal
- ▶ Odour level
- ▶ Conformability rating
- ▶ Slippage level
- ▶ Comfort during wear
- ▶ Ability to wear normal clothes and footwear
- ▶ Impact on mobility
- ▶ Wound size reduction and healing
- ▶ Clinical signs of infection
- ▶ Oedema level
- ▶ Skin condition rating
- ▶ Moisturisation rating.

Adverse event forms were provided and a strict process put in place for the reporting of any suspected deviations from the protocol, with instructions that the clinical monitor should be informed



Figures 2 and 3.

*Images show two different patients with the bandage system newly applied.*



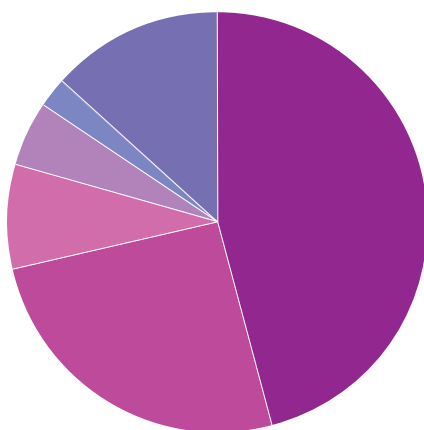
- Very comfortable
- Comfortable
- Uncomfortable
- Not completed

Figure 4. Ratings for the comfort of the HERO H-2 bandage system.

so that further investigations could take place.

A final assessment was undertaken at the end of the evaluation to assess the following parameters:

- ▶ Patient comfort
- ▶ Bandage slippage
- ▶ Movement and ankle flexibility
- ▶ Mobility
- ▶ Weight of bandage system during wear



- Slippage 0cm
- Slippage 1cm
- Slippage 1-2cm
- Slippage 2cm
- Slippage 2.5cm
- Slippage 3cm
- Slippage not completed/withdrawn

Figure 5. Levels of bandage slippage reported in the HERO H-2 bandage system.

- ▶ Ability to wear normal clothes and footwear
- ▶ Overall experience, including an open comments section.

Investigators were further invited to feedback on any visual observations, advantages or disadvantages of the dressing, and recommendations for future use.

**Results**

**Ease of implementation**

All centres reported that application of the HERO H-2 bandage system was easy to learn and that they also found it easy to train others in its use. The HERO H-2 was easy and quick to apply and could be removed simply in one piece.

**Patient benefits**

The aesthetic appearance of the HERO H-2 bandage system was rated 'excellent' by 63% of the investigators and 'good' by a further 31% (Figure 2 and 3). Patients also reported maintenance of bandage integrity and appearance during the wear time.

**Comfort**

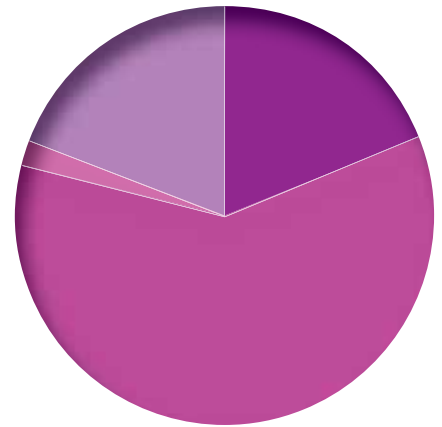
Of the investigators, 43% said that their patients had found the system 'very comfortable'; 31% found it 'comfortable'; and 14% reported it to be 'uncomfortable'. Patients commented that the dressings increased comfort immediately after application and during wear, and that the bandage felt 'lightweight' during full evaluation, with zero odour (Figure 4).

**Conformability**

The conformability of the HERO H-2 bandage system was rated 'excellent' by 66% of the investigators, while 29% found it to be 'good', with patients reporting the low profile and reduced bulk as a key benefit. Slippage of the bandage during one week's wear time was reported as 'zero' by 45% of the investigators, and '1cm' by 23% (Figure 5).

**Ankle movement**

The ability of patients to move their ankles while in the HERO H-2 bandage system was rated 'excellent' by 49% of investigators and 'good' by a further 26%.



- Excellent
- Good
- Poor
- Not completed

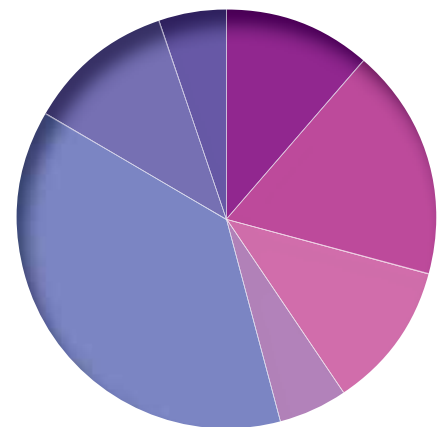
Figure 6. Ratings for the mobility of the HERO H-2 bandage system.

**Mobility**

The mobility of patients in the HERO H-2 bandage system was rated as 'excellent' by 20% of investigators and 'good' by a further 60% (Figure 6).

**Clothing and footwear**

The patient's ability to wear 'normal' clothing while undergoing treatment with the HERO H-2 bandage system was rated as 'excellent' by 34% of investigators and 'good' by 49%; whereas the ability to wear normal



- Healed at week 2
- Healed at week 3
- Healed at week 4
- Healed at week 5
- Healed at week 6
- Healed at week 7
- Healed at week 8
- Healed at week 15

Figure 7. Points at which wounds healed throughout the evaluation period.



Figures 8 and 9.

*Images show two different patients following seven-day wear of the bandage system. It was noted that the bandage had retracted up the dorsal, therefore the next application was lowered towards the toes to compensate for this.*



Figures 10–13.

*In this patient, wound healing was progressing at week six, therefore the evaluation continued and complete wound closure was achieved at week 11.*

footwear was rated 'excellent' by 43% and 'good' by 43%.

#### Wound-associated outcomes

Of the 40 patients who were enrolled on the evaluation, 18 were reported to have healed at various points during the six-week evaluation (Figure 7), with wound reduction reported in all but one patient whose ulcer increased in size due to an infection (at which point antimicrobial therapy was implemented and the patient withdrawn from the evaluation) (Figures 8–13 show progression throughout the evaluation).

Oedema was consistently reported as being significantly reduced and skin condition was reported as 'much better than previously' in 17% of patients; 'better than previously' in 49%; 'the

same' in 17%; and 'deteriorated' in 9% (Figures 14 and 15). No changes to the patient's usual emollient use (usually 50/50 ointment, a mixture of soft and liquid paraffin) were consistently reported, and in some cases the patients were using a cotton liner applied underneath the bandage.

#### DISCUSSION

Patient feedback relating to a whole range of factors — aesthetic appearance, comfort, conformability, the weight or bulk of the HERO H-2 bandage system, increased mobility, ankle movement and ability to wear normal clothes and footwear — was overwhelmingly positive and reflected the findings of previously undertaken individual cases.

Slippage was reported to be lower than expected, with 51% reporting no slippage at all. In the first two weeks of any compression therapy regimen a significant limb volume reduction would be expected, consequently resulting in some degree of bandage slippage, possibly requiring an increase in bandage changes (up to twice-weekly). Further exploration of the data in this evaluation, however revealed that oedema was indeed often reported as 'significantly reduced' or 'reduced' in these patients — this suggests that a slight bandage slippage might not have been recognised and reported in these patients.

Odour control and odour relief in those indicating higher malodour levels on initiation was often reported as 'no odour' during the evaluation, despite some data sets revealing signs of clinical infection. However the data also showed that the investigators promptly began the appropriate use of antimicrobial therapies in these cases.

Wound size reduction and complete healing were consistently reported in this evaluation. However, one limitation to these outcomes may be that those who continued the evaluation beyond the six weeks and achieved healing within the first eight weeks included patients whose wound size was often smaller and of shorter duration on initial recruitment. However, larger wounds with a longer duration were treated beyond the six-week evaluation and did still continue to demonstrate positive healing outcomes.

Routine emollient use remained unchanged with skin condition often being cited as 'better' (49%) and 'much better' (17%) during the evaluation, a significant result when considering that best practice skin care and limb washing (exfoliating) standards were already in place and many of the patients were reported to have 'good' skin condition at the start of the evaluation.

Regarding the 9% of patients whose skin condition deteriorated, this was attributed to an exacerbation

of previously longstanding eczema requiring frequent steroid treatments.

Interestingly, all of the patients who developed eczema were withdrawn during the study by the dermatology specialists — the data also revealed that all of these patients were using cotton liners as part of their treatment, therefore removing the likelihood of irritation by the HERO H-2 bandage system.

All adverse events and patient withdrawals reported (this amounted to eight patients altogether) were investigated by the clinical team and it was concluded that none of these were directly attributable to the HERO H-2 bandage system.

## CONCLUSION

This 40-patient multi-site evaluation examined the use of the HERO H-2 bandaging system in a variety of patients and with a wide range of outcome measures, including ease of use and implementation into practice, as well as patient benefits such as quality of life, pain and mobility.

The evaluation also looked extensively at wound reduction and wound healing times and the generally

### Patient comment

‘Excellent and not conscious of the bandages being on my leg — lightweight and very comfortable. Less bulky. Bandaging couldn’t have been better.’

### Nurse comment

‘The advantage of the HERO H-2 system is that it was hypoallergenic. One patient had a longstanding history of sensitivity to everything, including hosiery. The system was lightweight and flexible and did not impact on her footwear, which was crucial as she is partially sighted and has a history of falls.’



Figures 14 and 15.

*In this patient, the periwound skin condition and integrity were maintained through weeks four to eight.*

positive nature of the results suggests that this system provides an excellent option for nurses dealing with an ever-wider range of patients and wound profiles in the community. **JCN**

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