Abstract

This study investigates the effect of a new short-stretch two-layer compression system in eight patients with common chronic lower-limb conditions in three locations in the UK. Chronic leg ulcers are the most common type of lower-limb ulceration with 70% caused by chronic venous hypertension. An appropriate level of compression is proven to heal chronic venous leg ulcers. The study was only a small sample of patients; however, the underlying conditions included chronic venous eczema, diabetes, sarcoma, cellulitis and mixed-aetiology ulcers.

During the study, the UK experienced some of the hottest temperatures in the last 30 years. This had an impact on five patients, who noted an increase in malodour associated with their leg ulcers. CoFlex TLC (Aspen Medical Europe Ltd) foam comfort layer is impregnated with cyclodextrin—a naturally based oligosaccharide known to reduce malodour. The zinc-impregnated foam bandages in this study were viewed very favourably by both patients and staff, particularly those who had chronic venous eczema.

Key words: Two-layer compression systems Venous leg ulcers Reduced malodour Zinc-impregnated foam

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Selecting the appropriate compression bandaging depends not only on the amount and type of compression required, but also on the likely compliance of the patient and other prevailing elements (Lazareth et al, 2012). For clinicians making a decision regarding which ranges of compression bandages should be included in formularies, it is important to understand where this type of dressing is appropriately used.

Compression therapy is the mainstay of venous leg ulcer management (Royal College of Nursing (RCN), 2006). It is generally accepted that compression is a fundamental treatment for the majority of venous leg ulcers (Moffatt et al, 1992). Four-layer bandage systems are regarded by many as the treatment of choice, although there is currently a wide range of compression systems available. It is widely reported within the literature that patients experience difficulties complying with compression therapies due to issues such as pain, appearance, exudate and odour, and accommodating footwear creating problems with activities of daily living. This is frequently even worse for patients in employment (Hyde et al, 1999; Douglas, 2001; Mudge et al, 2006; Hayes and Day, 2008). Chronic leg ulcers are the most common type of lower-limb ulceration, with 70% caused by chronic venous hypertension (Burrows et al, 2007; Green and Jester, 2009).

Aims of study

Recent advances in compression therapies have allowed the development of lightweight, odour-controlling multi-layer bandages that aid wound healing without compromising...
Method

Eight patients were recruited (4 males, 4 females) with a mean age of 65.75 years across 2 acute trusts and 2 primary care trusts on the Isle of Wight and East Kent. Five patients had clinical evaluation forms completed over a 4-week period. All patients had clinical evaluation forms completed for up to 4 weeks or until healed. Patients were asked to record their experience in a diary incorporating a ‘numerical’ and a ‘faces’ pain rating scale (Wong and Baker, 1988). Both clinicians and patients were asked to complete the evaluation in relation to wear time and slippage. The short-stretch systems were applied according to clinical need following a comprehensive leg ulcer assessment, which included the following:

- Underlying disease—such as chronic venous insufficiency associated with venous eczema, diabetes, peripheral vascular disease and sarcoma
- Doppler assessment with ankle brachial pressure index (ABPI) was recorded in line with current trust protocols.

Results

Two patients in this study were treated for cellulitis, with one requiring hospital admission. Two patients had chronic venous eczema. A total of three patients were diabetics, and one patient had an ulcer following surgery and chemotherapy for a sarcoma. Four patients had the zinc-impregnated foam bandages (UBZ) (Aspen Medical Europe) applied successfully. Two patients had mixed aetiology ulcers and were unable to tolerate a modified four-layer compression. They were treated with CoFlex TLC Lite (Aspen Medical Europe). During this study, the UK experienced some of the hottest temperatures recorded in the last 30 years. This had an impact on the three patients in the study who noted an increase in malodour associated with venous eczema, diabetes, peripheral vascular disease and sarcoma. Four patients had the zinc-impregnated foam bandages (UBZ) (Aspen Medical Europe) applied successfully. The short-stretch systems were applied according to clinical need following a comprehensive leg ulcer assessment, which included the following:

- Underlying disease—such as chronic venous insufficiency associated with venous eczema, diabetes, peripheral vascular disease and sarcoma
- Doppler assessment with ankle brachial pressure index (ABPI) was recorded in line with current trust protocols.

Discussion

The zinc paste bandages in this study were very popular with both the patients and staff, with one patient stating that it was ‘the Rolls-Royce of compression’. Skin irritation due to varicose eczema is particularly common. Nurses caring for patients with these problems may opt for the application of zinc paste bandages in order to address this issue, as paste bandages contain zinc oxide. The bandages are occlusive and also increase the absorption of steroids and other topical applications to the patient’s skin (Lansdown, 2007). However, many difficulties are associated with the application of paste bandages, mainly due to the specific nature of the application method. Paste bandages are applied wet and contract as they are drying, so can constrict blood supply to the lower limb. In order to avoid this, paste bandages have to be applied further up the leg in a herringbone application, so that if the bandage dries it does not necessarily constrict the skin, and the limb has the opportunity to expand. Skin damage and breakdown can occur as a result of the inappropriate or incompetent application of these dressings. Paste bandages can be applied under compression bandaging (European Wound Management Association (EWMA), 2003; Scottish
Intercollegiate Guidelines Network (SIGN, 2010), but this further bulks out bandages and can interfere with patients then being able to use normal footwear. Clinicians and patients also find the application of paste bandages messy and it can cause staining to clothing.

CoFlex UBZ bandages incorporate zinc oxide into the first layer of the bandage, allowing the zinc oxide to be directly applied to the skin without the need for additional paste bandages. Clinical evaluation of these bandages has demonstrated that patients who have these bandages applied experience relief of the irritating symptoms of varicose eczema (McDermott and Simon, 2013; Simon and McDermott, 2013; Smith and Gibson, 2013). Additionally, the bandages can be applied consistently by practitioners to produce effective compression therapy levels (Stephen-Haynes, 2013). The bandaging system has two layers and reduces the amount of bulk applied to the patient’s foot, so footwear is easier to apply in these circumstances. Having zinc oxide in the compression system also reduces the amount of time that nurses require to apply the bandages, and reduces the complexity of the procedure, thereby increasing standardisation.

Case study 1

This case concerns a gentleman, BR, who is 75. Past medical history includes a myocardial infarction and hypertension. He has lived in residential accommodation for a number of years due to poor mobility and recurrent bilateral ulceration. Following the latest recurrence of his ulceration, the leg ulcer care pathway was completed together with a Doppler assessment, and this confirmed that the ulceration was predominantly venous. Both legs had areas of ulceration, but the right leg had several areas of sloughy ulceration. The posterior area of the leg was dry and there were areas of maceration to the anterior area.

He had compression bandaging previously but the district nurses were concerned about the continued use of compression because he tended to push the bandages down in an attempt to get ease from the constant itching. It was decided to apply CoFlex UBZ to his right leg. The zinc-impregnated comfort roll was applied next to his skin, with a cohesive bandage on top. This bandage was selected to reduce the itching associated with the venous eczema to his leg. The bandage conformed with the leg and was easy to apply. Because it was just two layers, the patient was less distressed in raising his leg compared to the four-layer system used previously. The bandage was initially changed twice weekly as the district nurses wanted to ensure that the bandages stayed in place and didn’t cause any further damage, but after the first week the visits for this leg were reduced to just once a week. Figure 3 shows the improvement to the ulceration after 3 weeks of compression.

Discussion

Compared to existing compression systems normally used within the Trust, this bandage system had the advantage that it was non-bulky and had the zinc oxide impregnated into the initial layer rather than through the addition of a separate bandage. The conformability of the bandage system also allowed the patient to wear normal footwear. The zinc-impregnated foam layer eliminated the need for a stockinette next to the skin, and the loose-fitting nylon stocking kept the bandage in place.

Conclusion

CoFlex UBZ with zinc provided a comfortable and effective healing environment for patients who had been unable to wear compression bandages previously. Patient comfort
improved and the bandages remained in place without any irritation. The addition of a zinc-oxide bandage to the existing bandage regimes was not necessary, reducing bandage bulk and also the cost of the treatment. This decision was well received by patients and nursing staff. The authors will continue to apply CoFlex UBZ with zinc on patients who have difficulty tolerating compression.

**Case study 2**

A 55-year-old lady who had previously suffered a sarcoma to her left calf 5 years ago was treated successfully with surgery and radiotherapy. However, the patient left with a chronic wound that had never healed, and had been self-managing the wound herself for a number of years.

This wound had been previously managed by the patient with foam dressings prescribed by her GP. There was a significant odour present and the lady was very embarrassed about it. The malodour associated with her leg ulcer limited social interaction with friends and family and prevented her from returning to work. Post-assessment of ABPI, a standard compression therapy had been applied; this resulted in the lady being unable to apply her own shoe and she subsequently had to be provided with prescription footwear. Odour remained a problem, with both staff and patient being aware of this.

The patient required a light, non-slip bandage that would promote healing. CoFlex TLC was therefore used. CoFlex TLC is a two-layer compression system that maintains consistent compression, providing 35–40 mmHg of pressure at the ankle. The first layer contains cyclodextrins, which occur naturally and work optimally in the presence of wound exudate, allowing for effective odour capture and neutralisation, which was one of the main treatment objectives.

**Dressing application**

This bandage system was easy to apply as it can be applied at full stretch if tolerated. The initial bandage stayed in place for 4 days and was renewed due to exudate levels. This was then reduced to weekly and, on each dressing change, no slippage of the bandage was noted. Nursing staff reported that CoFlex TLC was easy to apply and conformed to the limb instantly.

**Patient comfort**

Prior to wearing this bandage system, a standard compression system was being used. The patient was unable to wear her own footwear, which was affecting her psychological wellbeing as she was reluctant to go out due to embarrassment. From the first application, the patient left the clinic with her own footwear on reporting that CoFlex TLC was very comfortable and helped to relieve her pain associated with the wound.

In comparison to other multi-layer compression bandages used on the wound previously, this system proved more comfortable and practical, while managing social problems.

**Results**

The wound continues to make good progress and is now at a more advanced stage of healing than it has ever been before (see Figure 4). Healthy granulation tissue became evident in the wound bed within the first week, with the wound dynamics also improving dramatically. The depth of the wound reduced within a week of application of CoFlex TLC and both patient and staff noted a considerable improvement with odour and exudate control. This wound has continued to improve and the lady has now returned to work. She has been delighted with the results of CoFlex TLC.

**Discussion**

Compared to the standard two-layer compression systems normally used within the Trust, this bandage system had the advantage that it allowed for malodour control. The conformability of the bandage system also allowed the patient to wear normal footwear. The soft foam eradicated the need for a viscose stockinette next to the skin, as did the provision of the nylon stocking to prevent the bandage sticking to clothing and bedlinen. No slippage of the bandage was identified throughout the period of the case study.

**Conclusion**

This case study has demonstrated the progressive successful treatment of a patient with a chronic leg ulcer post removal of a sarcoma. The CoFlex TLC with malodour control provided a moist wound-healing environment that controlled odour, allowing the patient to return to work. Patient comfort was improved with the conformability of the bandage. In comparison to other multi-layer compression bandages used on the wound previously, this system proved more comfortable and practical, while managing the social problems the lady encountered as a result of this wound, particularly in
relation to odour. The authors will continue to evaluate this product on a selection of chronic venous leg wounds in the community.

Case study 3

This 58-year-old male was recently discharged from hospital having been treated for recurrent cellulitis following a trauma injury while working on his farm in April 2013. He had just completed a 5-day course of intravenous antibiotic therapy. The discharge letter discussed acute lipodermatosclerosis.

Past medical history

Mr R has been an insulin-dependent diabetic for 31 years, with blood glucose ranging between 19 and 14. He had an intraocular haemorrhage and was partially sighted. He had bilateral nail avulsions for previous infections. He was discharged on penicillin V 500mg twice daily, and flucloxacillin 500mg four times daily.

Upon examination, the right lower shin was found to be painful and swollen with associated mild erythema. Mr R described the pain as a burning sensation and described this as a 'scald'. With a numerical rating of 7, Doppler examination ABPI above 1.1 bilaterally, Mr R commenced using new zinc-impregnated foam two-layer compression bandages (CoFlex UBZ). He stated that it felt ‘cool and comfortable to wear’. He was reviewed within 24 hours following first application as he was at high risk of peripheral vascular disease. Initial swelling reduced and the limb was redressed after 3 days. It was important that Mr R could continue to wear his wellington boots as he has livestock to care for. The two-layer bandages come with a stockinette, and he found that this enabled him to get into his boots. This also stopped the sheets from sticking to his leg at night. During his care, some of the hottest temperatures on record were recorded in Kent. Despite this, Mr R continued to wear the compression. By week 3, Mr R had completely healed.

During the acute phase of cellulitis, Mr R could not tolerate any compression. All diabetic patients remain at high risk of infection and slow healing, and Doppler examination can be misleading. Careful monitoring of the lower limb was vitally important. He did not complete the patient diary after the second day as he was too busy on the farm. The short-stretch bandage system combined with systemic antibiotic therapy enabled Mr R to continue to manage his farm, reduce the oedema and, most importantly, keep his leg cool—even in hot weather.

Conclusion

The new two-layer short-compression system was evaluated favourably in terms of both performance and quality of life outcomes in the patients recruited in this study. The zinc-impregnated bandages were popular with the patients in the study, particularly those with venous eczema and associated oedema. The stockings supplied with the bandages prevented bandages from sticking to bedclothes, which improved sleep patterns. One limitation of the study is that there were only...
eight patients, but the case studies demonstrate that, even with a wide range of underlying conditions and comorbidities, the variety of compression available in the CoFlex range offered solutions to these patients in order to meet their individual needs.

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**References**


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