



Two steps
to comfortable
effective
compression

Clinical Summaries

Clinical summaries - introduction

Compression therapy remains the cornerstone of the management of leg ulceration. Over the last two decades research has shown how effective it is in promoting healing as well as demonstrating its cost effectiveness when used within an effective leg ulcer service. Compression also dramatically improves the quality of life for the patient particularly by reducing pain and improving mobility.

Despite these advances, clinicians face many outstanding problems when using compression therapy. Patients with chronic, often



recurrent bouts of ulceration develop changes in the contour of the limb and increased vulnerability from pressure damage as a result of this. Effective compression requires a system that can address these issues by correcting the shape distortion and providing protection to vulnerable areas. Another major challenge is preventing bandage slippage.

The new 3M™ Coban™ 2 Layer Compression System is a welcome technological advance in compression therapy. It has been carefully developed with clinicians and is currently being evaluated in research trials, an important requirement to demonstrate its effectiveness. While some investment has occurred in compression therapy over the last decade little attempt has been made until now to examine the use of new types of materials. This new system is novel and allows the correction of even extreme shape distortion with the foam layer. The two layers laminate together to form a consistent and flexible compression system that is capable of applying high, sustained compression - a requisite for ulcer healing.

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3M™ Coban™ 2 Layer Compression System

Clinical summaries

2006

Schuren J and Collier M (2006) Evaluation of ease of use and reproducibility of provided pressures, comparing 3M™ Coban™ 2 Layer Compression System to four currently marketed compression systems.
Data on file, 3M Health Care, Loughborough, UK, 2006. Abstract published in the *Journal of Wound Care* 2007;3M (Suppl):1–12 An Evolution in Compression.

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Schnobrich E, Solfest S, Bernatchez S, Zehrer C, Tucker J and Walters SA (2006) 7-day, in-use assessment of a unique, innovative compression system.
Data on file, 3M Health Care, Loughborough, UK, 2006.

2

Davies T, Arrowsmith M and Stephens C (2006) The impact of a new 2-Layer compression system on patients concordance when used in the treatment of chronic venous leg ulcers.
Poster presentation at the 16th Conference of the European Wound Management Association, Prague, 18-20 May 2006.

3

Kerr A and Hampton S (2006) Summary of five case studies on the treatment of venous leg ulcers with a new two layer compression system in a community setting.
Data on file, 3M Health Care, Loughborough, UK, 2006.

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Kerr A and Hampton S (2006) Achieving compression treatment in the dysmorphic limb with a new 2 layer compression system.
Poster presentation at Wounds UK 2006 Wound Care Conference, Harrogate, 13-15 November 2006.

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Hayes W and Day J (2006) Evaluating a new and unique 2 layer compression system for patients with chronic venous leg ulceration.
Poster presentation at Wounds UK 2006 Wound Care Conference, Harrogate, 13-15 November 2006.

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Kerr A and Hampton S (2006) Empowering the leg ulcer patient: treatment of venous leg ulcers with the new 2-layer compression system: 3M™ Coban™ 2-Layer.
Poster presentation at Wounds UK 2006 Wound Care Conference, Harrogate, 13-15 November 2006.

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Schuren J and Mohr K (2006) SUB-BANDAGE PRESSURES: THE LAPLACE LAW REVISITED.
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Abstract published in *An Evolution in Compression. J Wound Care* 2007;3M (Suppl):1–12.

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Poster presentation at the 17th Conference of the European Wound Management Association, Glasgow, 2-4 May 2007.

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Henderson V (2007) The successful use of a new compression system in treatment of ulceration of the lower limb associated with pyoderma gangrenosum. A case study.
Poster presentation at the SAWC & WHS 2007, Tampa, Florida. April 28 - May 1, 2007.

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3M™ Coban™ 2 Layer Compression System

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- Brockwell F** (2007) Coban 2 Layer Compression System; An aid to patients concordance with compression therapy. Poster presentation at the 17th Conference of the European Wound Management Association, Glasgow, 2-4 May 2007. **13**
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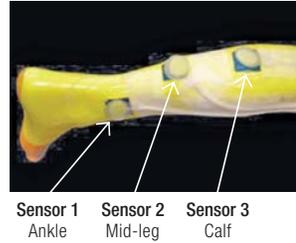
Evaluation of ease of use and reproducibility of provided pressures, comparing 3M™ Coban™ 2 Layer Compression System to four currently marketed compression systems.

Full Reference

Schuren J and Collier M (2006) Evaluation of ease of use and reproducibility of provided pressures, comparing 3M™ Coban™ 2 Layer Compression System to four currently marketed compression systems. Data on file, 3M Health Care, Loughborough, UK, 2006. Abstract published in the Journal of Wound Care 2007;3M (Suppl):1–12 An Evolution in Compression.

Publication Type

International Multi-Centre Comparative Evaluation – 3M™ Coban™ 2 Layer Compression System, Short Stretch and 4-Layer.



Key Outcome Points

- Significantly improved reproducibility of applied sub-bandage pressure
- Significantly more consistent compression layer application with Coban 2 layer system.
- Quick to learn and easy to apply
- Graduated compression not achieved with any bandage system tested
- 40mm Hg not achieved at sensor 1 (ankle) in any bandage system tested

Methodology

32 expert bandagers applied three consecutive applications of their most used system, followed by three consecutive applications of the Coban 2 layer system to an artificial limb over three pressure sensors.

Applied sub-bandage pressure measurements were recorded for each bandager.

Variance in applied bandage tension was measured by marking 10cm intervals on the applied bandage and comparing against the measurement when the bandage was relaxed.

A final evaluation of experts experience and opinions of the new system was obtained.

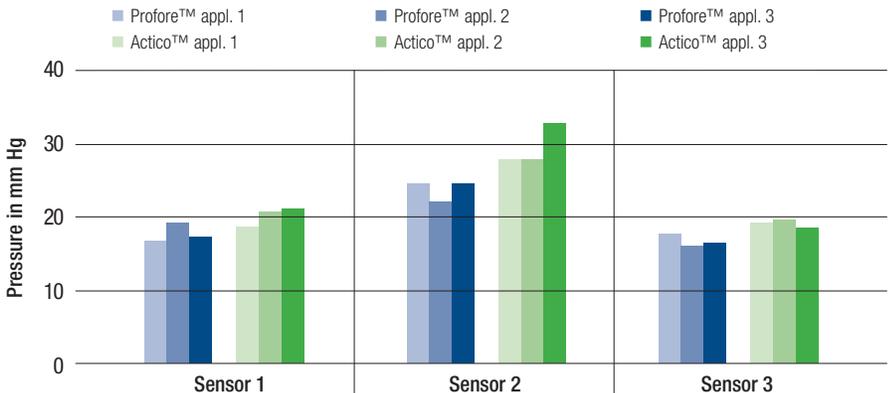


Figure 1: Average pressure values achieved when applying alternative bandage systems.

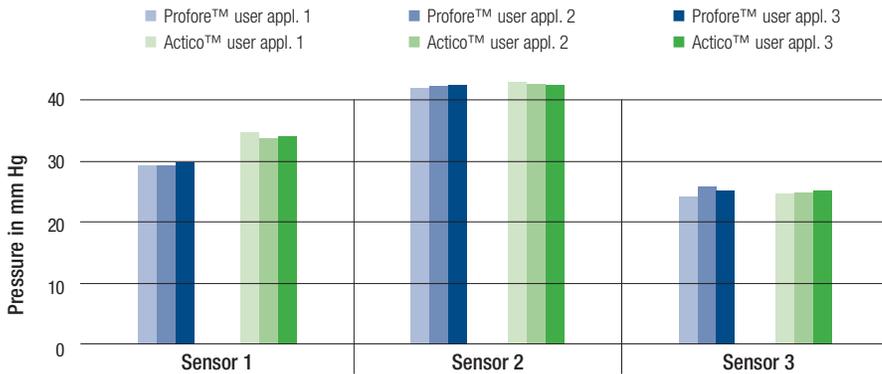


Figure 2: Average pressures achieved by users of alternative bandages when applying the Coban 2 layer system.

Results

Graduation of compression was not observed in any of the bandage types, with the highest pressure consistently noted at the mid-leg sensor two.

None of the bandage applications achieved 40mm Hg at the ankle sensor 1, however the pressures achieved with the Coban 2 layer system were closer to this figure than the other applications.

Both regular short stretch and 4-Layer users achieved consistently higher and more reproducible pressures when applying Coban 2 layer system.

Experts achieved a significantly more consistent bandage tension when applying the Coban 2 layer system compared to their familiar application.

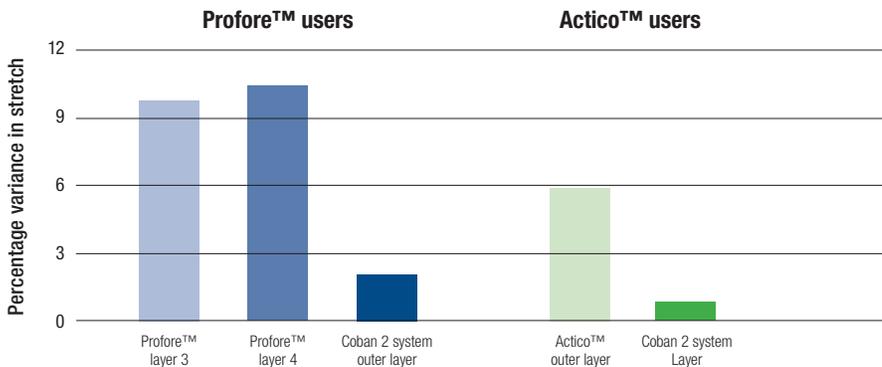


Figure 3: Reproducibility of stretch: changes in % between applications (light shaded bars familiar applications - dark shaded bars Coban 2 layer system applications)

Discussion/Summary

Reproducibility in the application of Coban 2 layer system application was found to be significantly more precise and consistently higher pressure profiles were obtained than with regularly used 4 layer or short stretch systems.

Expert evaluations also demonstrated that Coban 2 layer system is easy and fast to learn, no matter which bandage the applier usually uses.

7-Day, in-use assessment of a unique, innovative compression system.

Full Reference

Schnobrich E, Solfest S, Bernatchez S, Zehrer C, Tucker J and Walters S A (2006) 7-day, in-use assessment of a unique, innovative compression system. Data on file. 3M Health Care Loughborough, UK 2006.

Publication Type

Volunteer study.

Key Outcome Points

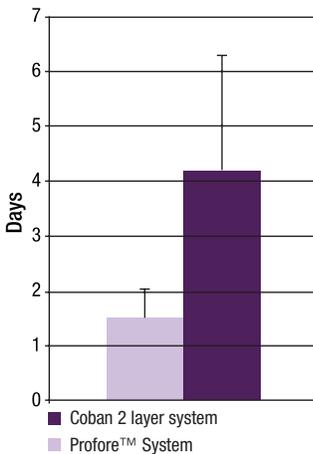
- Improved comfort
- Improved wear time
- Reduced slippage
- Less interference with clothing, footwear, mobility and sleep

Methodology

10 healthy volunteers acted as their own control having 3M™ Coban™ 2 Layer Compression System applied to one leg and Profore™ applied by an experienced independent clinician to the other leg.

Assessments of comfort, wear time, mobility, application and removal time, sleep interference, effect on clothing and footwear and slippage were obtained at 1, 2, 3, 6 and 7 days.

Mean Wear Time (number of days product was worn)



Number of Subjects Still wearing the Bandage over Time

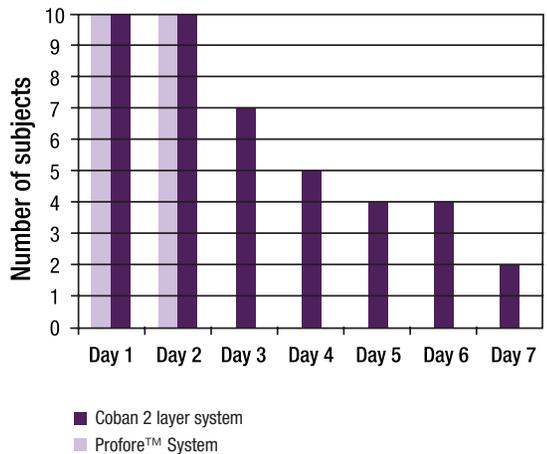


Figure 1: Coban 2 layer system had an average wear time almost 3 days longer than the Profore™ system (4.2 days versus 1.5 days).

Results

Volunteers rated the Coban 2 layer system as more comfortable than Profore™ and this was reflected in the average wear time of 4.2 days compared to 1.5 days in the Profore™ system. Volunteers also experienced less interference with their mobility, choice of clothing and sleep when wearing the Coban 2 layer system. The Coban 2 layer system was significantly quicker to apply and remove. Observations on one volunteer showed that the Coban 2 layer system had slipped only 8mm after 7 days of wear.

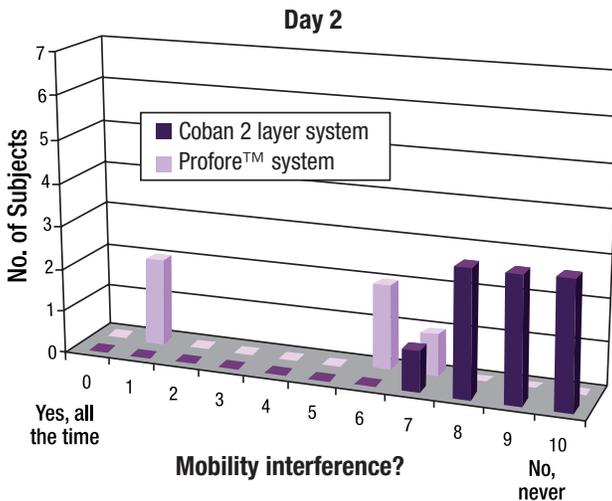
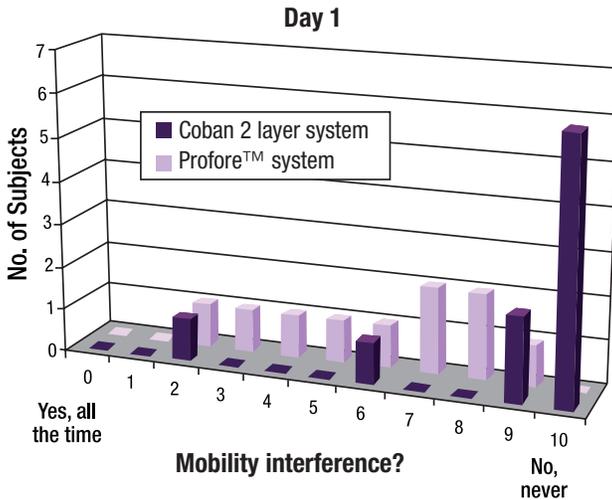


Figure 2: 3M Coban 2 layer system caused less mobility interference than the Profore™ System.

Discussion/Summary

Compression bandage efficacy is related to how well the bandage stays in place to provide sustained compression, and to patient acceptance of the therapy. The more comfortable the bandage is, the more likely the patients will wear it as prescribed and will obtain the expected benefits in terms of wound healing. This study confirms the positive performance attributes of the new Coban 2 layer system when compared to the Profore™ system.

The impact of a new 2 Layer Compression System on patient concordance when used in the treatment of chronic venous leg ulcers

Full Reference

Davies T, Arrowsmith M and Stephens C (2006) The impact of a new 2-Layer compression system on patients concordance when used in the treatment of chronic venous leg ulcers. Poster presentation at the 16th Conference of the European Wound Management Association, Prague, 18-20 May 2006.

Publication Type

Poster Presentation – 2 x Case Studies

Key Outcome Points

- Improved comfort
- Improved mobility
- Ability to wear normal footwear
- Minimal slippage
- Easy to use
- Wear time 7 days
- Minimal strikethrough
- Ulcer improvement and healing

Methodology

Two patients with chronic venous ulceration participated in this six week case study. At each bandage change the height of the top of the bandage from the floor was measured pre removal and when re-applied. From this data the slippage was calculated. Photographs were obtained and wound measurements recorded. Optional patient feedback was documented.

Results

Both cases demonstrated low slippage levels, improved wear time and comfort.

Case 1 – (previous 3-layer) reported reduced pain, increased mobility due to reduced bulk of system. Ulcer improvement was recorded by digital photography and can be seen in figures 1 and 4 below.



Figure 1



Figure 2



Figure 3



Figure 4

Case 2 – This young patient reported improved comfort and was able to wear their normal footwear. No slippage was observed and strikethrough was minimal. The bandage system was able to be worn for 7 days between changes and in this instance the patient’s ulcer healed during the evaluation period.



Figure 5



Figure 6



Figure 7

Discussion/Summary

The Coban 2 layer system was found to be easy to apply, demonstrated minimal slip, improved comfort, extended wear time and resulted in positive patient ulcer size and healing outcomes.

Summary of five case studies on the treatment of venous leg ulcers with a new two layer compression system in a community setting.

Full Reference

Kerr A and Hampton S (2006) Summary of five case studies on the treatment of venous leg ulcers with a new two layer compression system in a community setting. Data on file. 3M Health Care Loughborough, UK 2006.

Publication Type

5 Patient Case Series

Key Outcome Points

- Easy to learn application technique
- Easy one piece removal
- Maintained integrity and shape
- The 3M™ Coban™ 2 Layer Compression system never changed due to slippage or sagging, minimal slippage was observed
- Frequently achieved 7 days wear - minimum wear 4 days
- Improved wound and skin condition
- Comfort

Methodology

Five patients were followed during a six week evaluation period, at each bandage application, the ankle and calf circumference of the patient was measured and recorded. The patient adopted a standard stance and the top of the bandage was marked at application and the height from the floor recorded. At removal the process was repeated and any slippage recorded. Digital photographs recorded skin condition, wound and bandage appearance at application and removal. Exudate levels were assessed subjectively as minimal, moderate or heavy.

Patient 3 (detailed here 1 of 5 reported case studies)

PK is a 61-year-old lady with osteoporosis and osteoarthritis in both her spine and right knee. Doppler assessment showed an ABPI of 1.16 and the arterial sounds were elastic and tri-phasic.

The patient has an eight year history of ulceration. The most recent treatment was short stretch compression therapy and a foam dressing containing silver.

The ulcer (6 cm x 2 cm) was situated on the medial aspect of the lower gaiter region (Figure 1). At the first assessment, there was no granulation tissue apparent, with pale patches within the wound bed. The exudate was green, suggestive of the presence of *Pseudomonas*, and the wound margins were scaly in appearance.

After three weeks of treatment with the Coban 2 layer system the wound had improved, showing signs of granulation and epithelialisation (Figure 2).

The patient's view of this bandage system, in terms of wound improvement and comfort levels, is very positive and requested its continued use after completion of the case study.



Figure 1: Initial assessment.



Figure 2: After 3 weeks

Results

Presented as 5 individual case studies – the condition of the wound improved in all cases and all patients found the Coban 2 layer system comfortable and an improvement on previous compression bandage systems.

Discussion/Summary

Coban 2 layer compression system was easy to apply and conformed well to a variety of limb shapes. Coban 2 layer system was found to be aesthetically pleasing and demonstrated 7 day wear time on the majority of patients, with minimal occurrences of strikethrough.

Achieving compression treatment in the dysmorphic limb with a new 2 layer compression system.

Full Reference

Kerr A and Hampton S (2006) Achieving compression treatment in the dysmorphic limb with a new 2 layer compression system. Poster presentation at Wounds UK 2006 Wound Care Conference, Harrogate, 13-15 November 2006.

Publication Type

Poster Presentation – Two case histories from a larger 20 patient case study

Key Outcome Points

- Limb reshaping – adaptable to individual limb shapes
- Significant improvement in pain levels
- Oedema reduction
- Healing promotion of long standing ulcers
- Improved mobility
- Ability to wear normal footwear
- Improved comfort
- Minimal slippage
- Increased wear time

Methodology

Modification to the application technique of the inner comfort layer was used to reshape dysmorphic limbs in preparation for the compression layer.

Extra comfort layer was applied to protect skin integrity and minimise bandage slippage. Weekly wound and limb assessments were undertaken alongside digital photography during the 6 week case study period.

Results

Patient 1

Patient 1 is an 83 year old gentleman with a venous ulcer situated on the lateral aspect of the right leg (Figure 1). The treatment of this long standing ulcer had been complicated by a leg deformity following a road traffic accident at the age of 18. Previous compression therapy had been unsuccessful in treating the ulcer. This gentleman had an active social life and had ridden a motor cycle until his doctor recently advised him to stop.

After 6 weeks therapy with 3M™ Coban™ 2 Layer System there was clear improvement in the wound (Figure 2) due to effective compression providing improved venous return and effective oedema management. Clearly visible is improved wound status and leg reshape through improved venous return and effective oedema management.

The patient got back onto his motorcycle. Increases in mobility, comfort, choice of footwear and minimal slippage enabled a wear time of seven days over the course of the study.



Figure 1



Figure 2

Patient 2

A 34 year old lady was referred to tissue viability by her insurers following a road traffic accident that resulted in a series of complex wounds to both limbs. A succession of wound therapies resulted in healing in all but one, now chronic, wound of the lower limb, the same limb being mis-shapen and having gross oedema. (Figure 3).

During treatment with the Coban 2 layer system, pain levels were significantly improved and limb oedema reduced by 4.5cm at the calf and 3.5cm at the ankle. This led to improved exudate management and an improvement in peri wound maceration. (Figure 5).



Figure 3



Figure 4



Figure 5

Conclusion

In this report on two difficult to treat lower limbs, the standard application technique was changed simply by applying additional sections of the comfort layer. This allowed the system to conform to the individuals' limb shape and reduce the risk of bandage damage. These application techniques are easy to learn and could overcome previous educational boundaries and in turn will enable the clinician to achieve therapeutic compression therapy even in dysmorphic limbs. It can be concluded that the new Coban 2 layer system, is a system that is easy to use, and the application technique is adaptable to effectively treat misshapen limbs.

Evaluating a new and unique 2 Layer Compression System for patients with chronic venous leg ulceration

Full Reference

Hayes W and Day J (2006) Evaluating a new and unique 2 layer compression system for patients with chronic venous leg ulceration. Poster presentation at Wounds UK 2006 Wound Care Conference, Harrogate, 13-15 November 2006.

Publication Type

Poster Presentation – Case series from a national study

Key Outcome Points

- Healing – all wounds improved significantly
- Easy to apply
- Comfort – patient satisfaction very high
- Ability to wear normal footwear
- Aesthetically more pleasing
- Cooler in hot weather
- Improved mobility and ankle movement
- No slippage
- Maintenance of skin integrity
- No exudate strikethrough
- No odour
- Improved concordance

Methodology

Four patients were seen weekly in the clinic of the authors for a period of six weeks. At each visit their ulcers were photographed and measured. The bandage height from the floor to the top of the bandages was recorded on arrival before bandage change and after every application of this system to assess bandage slippage. The patients' experience of the system and their comments were recorded at week 3 and week 6. A lipido-colloid or other simple non-adherent wound contact layer was used beneath the compression system. All of the patients included in the study had previously experienced other forms of compression therapy and had not responded successfully to these treatments.

Case study 1



Figure 1: At commencement of treatment.



Figure 2: 3 weeks later



Figure 3: 5 weeks later

Case study 2



Figure 4: At commencement of treatment.



Figure 5: 4 weeks later



Figure 6: 10 weeks later

Results

In each of the four cases the wound dimensions reduced over the 6 week period. One patient progressed to complete healing, and two of the patients demonstrated a significant improvement in the wound bed tissue. Deterioration in the wound bed of one patient was noted but this coincided with an increase in his working hours and the amount of time he spent with his legs in the dependent position.

All of the patients experienced an increase in comfort levels associated with compression therapy in comparison to their experiences with other compression therapies. These patients experienced no adverse events and there was no evidence of compression damage. All of the patients featured in the poster were concordant with the therapy. The aesthetic appearance of the new Coban 2 layer system was regarded as a very positive factor for this group of patients. In all cases the patients were able to wear footwear of their choice resulting in a positive effect on their body image. Case studies 2 and 4 reported an improvement in their mobility and case study 4 is now able to walk without the aid of her walking stick.

All the featured patients reported an improvement in their ability to undertake their normal activities of daily living.

Discussion/Summary

The efficacy of compression therapies can be seen as multi-factorial and dependant upon the education and skill of the healthcare practitioner in achieving compression tailored to the individual needs of the patient, thereby influencing the patient's acceptance of the selected therapy.

As clinicians, we found the new Coban 2 layer system easy to apply and after familiarisation with the product we found it took a much shorter time to apply in comparison with other types of compression therapy. However, we are cognisant of the fact that education and competence remain issues that are vital to patient safety, and are pertinent to all compression therapy systems.

The patients were seen for a six week period by two specialised practitioners and it is difficult to quantify the effect that this may have had on the outcomes reported. It is recognised that specialist knowledge and expertise lends itself to improved outcomes for patients. The concordance of the patients may have been influenced by the fact that they were participating in the evaluation.

Our overall findings support the use of the new Coban 2 layer system as an effective and patient friendly option for the delivery of compression therapy.

Empowering the leg ulcer patient: Treatment of venous leg ulcers with a new 2 Layer Compression System.

Full Reference

Kerr A and Hampton S (2006) Empowering the leg ulcer patient: Treatment of venous leg ulcers with the new 2-layer compression system: 3M Coban 2-Layer. Poster presentation at Wounds UK 2006 Wound Care Conference, Harrogate, 13-15 November 2006.

Publication Type

Poster Presentation – Report of 20 Case Studies

Key Outcome Points

- Easy to learn
- Reliable and safe
- One piece removal
- Improved comfort
- Improved concordance
- Low slippage
- Oedema reduction
- No strike through
- Improved ulcer condition and healing

Methodology

Patients were Doppler assessed and confirmed as having an ABPI of >0.8 . The compression system was applied and patients were assessed weekly by clinicians experienced in the application of compression bandage systems. Oedema was recorded by weekly measurement of the circumference of the ankle and calf. To assess bandage slippage, the bandage height was measured (both at time of application and removal) from floor to top of the bandage with the patient stance standardised.

Digital photographs recorded the condition of the patient's leg, wound and bandage at each application and removal. Wound progress was assessed using wound planimetry and patient views on their therapy recorded. Ease of application and removal was assessed by the users.



Figure 1: At study commencement



Figure 2: 3 weeks later

Results

In the experience of the authors, levels of bandage slippage were low, with the appearance at removal being often similar to that at time of application. Oedema was often markedly reduced during wear time of the bandage but without a simultaneous slippage in the compression system applied to the leg. In no instances were bandages changed due to slippage or loss of compression. Also, on no occasion did exudate strikethrough lead to early bandage change.

Generally wound condition improved and several of the leg ulcers healed during the six week treatment period. Many of the patients preferred the new system to their previous compression therapy and expressed the desire for continuing therapy with Coban 2 layer system.



Figure 3: Healing at 10 weeks

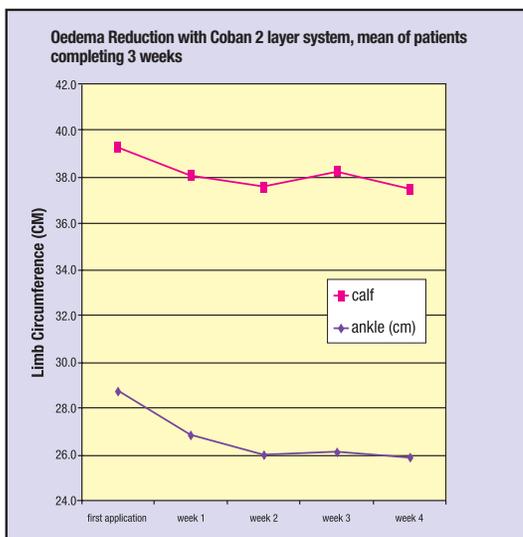


Figure 4

Discussion/Summary

Venous leg ulcers that had previously been treated with standard compression therapy but had not progressed, showed significant improvement in this new 2 layer system. In the experience of the authors, this system shows lower levels of bandage slippage compared to alternative compression bandages available. Although this compression system has a low profile being only two layers, strikethrough was not a reason for bandage change.

We suggest the ability of the system to effectively reduce oedema whilst maintaining effective compression has clinical benefits for the patient. This view was reflected in the comments of patients, for example “Much, much better . . . do I have to go back to my other bandage?”

Sub-bandage pressures: The LaPlace law revisited.

Full Reference

Schuren J and Mohr K (2006) Sub-bandage Pressures: The LaPlace Law Revisited. Wounds UK 2006 Wound Care Conference, Harrogate, 13-15 November 2006.

Publication Type

Oral presentation.

Key Outcome Points

- Pressure profiles predicted by LaPlace's law not observed in practice
- Graduated pressure observed in only 6.8% of bandage applications
- Pressure value of 40mm Hg at the ankle and 17mm Hg at the calf not observed in any bandage application

Introduction

According to the interpretation of LaPlace law, there is a direct relationship between the leg circumference and sub-bandage pressures. The aim of this paper is to review the widespread belief that the LaPlace law is a useful tool to predict and calculate sub-bandage pressures. Recently, several studies were performed to compare the new 3M™ Coban™ 2 Layer Compression System with established compression systems and to measure sub-bandage pressures. The results presented are extracted from two separate studies.

Methodology

192 bandage applications were conducted over 2 separate studies. In each study pressure measurements were recorded at 3 sensors and the resulting data collated for presentation.

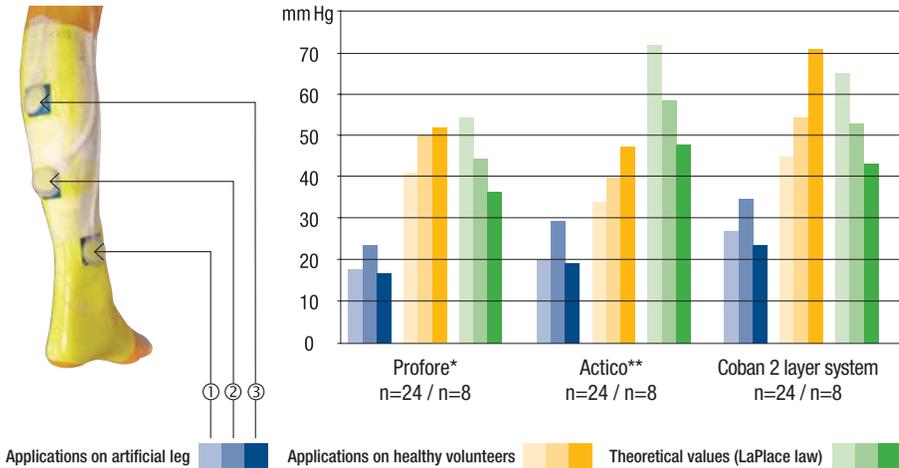
In the first study, 32 experts in the application of compression bandages were invited to apply their

most used compression system three times to the artificial leg. After a short introduction, they applied the Coban 2 layer system three times. In a second study, 4 invited experts in the application of compression bandages applied their most frequently used system eight times on healthy volunteers.

In all studies, the following compression systems were compared to the Coban 2 layer system:

- ProFore®, (Smith & Nephew Medical Limited, Hull, England);
- Actico®, (Activa Healthcare Limited, Staffordshire, United Kingdom);
- Unna's boot, (Graham-Field Medicopaste®) covered with a Coban bandage roll (3M Health Care, St. Paul, USA);
- Rosidal® K, (Lohmann & Rauscher International GmbH & Co. KG, Rengsdorf, Germany).

Before application to the artificial leg, theoretical pressure values on the three pressure sensors (positioned at 22, 27 and 33 cm leg circumference) were calculated with the LaPlace equation. The force delivered by each individual bandage (KgF), was calculated from measurements on a tensile tester per manufacturers' recommendation.



Results

In total, 192 compression bandages were applied on the artificial leg. Graduated compression was only observed in 13 applications (6.8%). In total, 64 compression bandages were applied on healthy volunteers. Pressure measurements were recorded from measurements in a supine resting position, immediately after the application. Also in this study true graduated compression was only observed in 6.8% of cases. Mean values were calculated for all bandage systems and compared to the theoretical values derived from the LaPlace equation. Although all compression systems in the two studies were applied by experts in the use of the systems under investigation, none of them achieved the expected graduated compression on an artificial leg or on the legs of healthy volunteers. None of the tested compression systems gave average pressures that would be predicted from the mathematical LaPlace equation.

Conclusion

The widespread belief that correctly applied compression systems give pressure values from 40mm Hg at the ankle, graduating to 17mm Hg below the knee, is based on mathematical equations and not supported by the results of the two presented studies. In these two studies the pressures achieved by expert bandagers were inconsistent with those predicted by the LaPlace equation.

Discussion

Although all bandages in the two studies were applied by experts there was a poor correlation between the sub-bandage pressures achieved on a model leg, volunteers' legs and those predicted from the LaPlace equation. From the results of this study we conclude that none of the tested systems could guarantee graduated compression. The data from the two studies clearly indicate that the use and applicability of the LaPlace law, to calculate in-vivo pressure values should be interpreted with caution.

An evolution in compression - two simple steps to sustained and comfortable compression

9

Full Reference

Moffatt C, Glover D, Price P, Clark M, Collier M, Schuren J, Hayes W and Day J (2007). Abstract published in An Evolution in Compression. J Wound Care 2007;3M (Suppl):1–12.

Publication Type

Journal abstract.

Contents:

Foreword

Christine Moffatt Professor of Nursing, Thames Valley University, London and Director, Centre for Research and Implementation of Clinical Practice, London

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Deborah Glover Editor, Journal of Wound Care

Leg ulceration: impact on everyday living and health-related quality of life

Patricia Price Professor of Health Sciences and Director of Research and Development, Wound Healing Research Unit, Cardiff

Are we too precious about pressures?

Michael Clark Senior Research Fellow, Wound Healing Research Unit, Cardiff University

Ease of use and reproducibility of five compression systems

Mark Collier Nurse Consultant/Tissue Viability Lead, Pilgrim Hospital, United Lincolnshire Hospitals NHS Trust and **Jan Schuren**, Technical Service Specialist, 3M Medical Markets Laboratory, Neuss, Germany

Practical experiences of 3M Coban 2 Layer Compression System

Wendy Hayes Nurse Consultant, Vascular Services and **Julie Day** Leg Ulcer Specialist Nurse, Worcestershire Acute Hospitals NHS Trust



Contributors - Front row (left to right): **Wendy Hayes, Keith Harding and Patricia Price**
Middle row: **Julie Day and Jan Schuren**
Back row: **Michael Clark and Mark Collier**

Introduction to the articles:

There can be no doubt that the introduction of compression therapy as a management approach to leg ulceration has made a difference to countless patients, both on a physical and psychological level. After having to live with an ulcer for months or even years, compression therapy, in most instances, facilitates an immediate reduction in pain, exudate and social isolation, along with healing, in approximately 12 weeks.

But even with this good news, many patients still do not have access to, or do not receive, appropriate compression therapy. There may be a

myriad of reasons for this, but perhaps the most common is lack of awareness of the various systems and modes of action (long- or shortstretch, multilayer or light), coupled with difficulties in appropriate and effective application.

This supplement aims to address these factors. It outlines some of the issues facing practitioners (who are trying to achieve the correct subbandage pressure and find the right system for their patient) and patients (how leg ulceration can affect their quality of life). It also reflects some practical experiences of using a new two-layer system and its effect on patients' physical and emotional well-being.

I hope you will find it useful to your everyday practice. After all, if a bandaging system is simple to use and, most importantly, effective, why not try it? You have nothing to lose and potentially much to gain.

Deborah Glover

Editor, Journal '07 Wound Care 2007

Evaluating the use of a new 2-Layer Compression System in a district nurse-led leg ulcer clinic.

Full Reference

Griffiths C (2007) Evaluating the use of a new 2-layer compression system in a district nurse leg ulcer clinic. The 17th Conference of the European Wound Management Association, Glasgow, 2-4 May 2007.

Publication Type

Poster presentation.

Key Outcome Points

- Ulcer improvement seen in 7 days
- Healing
- Fewer clinic visits required
- Improved comfort
- Decreased pain
- Improved mobility
- Low slippage, no wrinkling or sagging
- Heel wear did not cause problems

Methodology

Six Patients were recruited to take part and four of these were selected as brief case studies for the poster presentation. All patients were already attending a district nurse led leg ulcer clinic and were using some sort of compression therapy to treat their venous leg ulcers.

Patients attended clinic either once or twice a week for a six week period. At each visit ankle and calf circumference were measured to assess any reduction in oedema and exudate levels were estimated using a simple scale. Digital photography was used to record the nature of the wound bed, condition of the patient's leg and appearance of the bandage both at application and removal. At each visit the patient's comments and concerns were noted with overall comments and feelings towards the new system recorded at the end of the six week period.

Detailed here are two of six case studies.

Case 3 - concerned with appearance

Mrs I is a retired lady who enjoys socialising and getting 'out and about'.

- The wound had been present for a substantial length of time, approximately 13 months.
- Previous compression therapy - short stretch and hosiery
- Main problem - Mrs I was concerned with the aesthetic appearance of compression bandages, and prefers wearing skirts and 'nice' shoes.

The wound measured 1 x 1.5 cm at the start of the evaluation and had healed by week 5, enabling Mrs I to wear hosiery again.

Maximum bandage slippage was measured at 1.5 cm and was always noticeable when Mrs I returned to clinic for dressing changes.

Also some wearing was observed on the heel (Figure 2), however Mrs I stated that this did not cause her any problems.

Mrs I commented "My bandages don't affect me anymore".



Figure 1 and Figure 2: Measuring bandage slippage

Case 4 - looking for comfort

- Mr T is a retired gentleman who is the main carer for his wife
- Mr T experiences recurrent ulcers and this particular wound had been in situ for 2 - 3 months.
- Previous compression therapy - short stretch, multi-layer system, 2-piece hosiery.
- Main problem - finds compression bandages do not stay in place and become uncomfortable.

Wound dimensions reduced in width by 0.5 cm whilst length remained 5cm.

Although it was felt that exudate levels had decreased this was difficult to quantify.

Throughout the evaluation there was no measurable bandage slippage and no wrinkling or sagging was observed.

Mr T commented "I used to get some pain around the ulcer at night but there is no pain at all with these new bandages".



Figure 3 and Figure 4

Results

As indicated in the case studies, all patients' wound dimensions reduced over the six week period and wound bed appearance showed marked improvement. All patients reported increased levels of comfort with the new bandages, Mr B in particular noting improvement in mobility due to reduced pain. Mrs I healed during the evaluation and Mr A's visits were decreased to once a week due to lower exudate levels. There was some variability in ankle and calf circumferences during the evaluation but all except Mr T experienced a decrease in oedema. None of the patients experienced a change in odour during the evaluation but the photography and measurements showed that the bandages sagged and wrinkled very little, with maximum bandage slippage measured at 1.5cm.

Conclusions

All patients with remaining leg ulcers requested the continued use of the new 3M™ Coban™ 2 layer Compression System rather than returning to their previous forms of compression therapy. Informal discussion with the patients indicated that this was primarily due to comfort and also aesthetic appearance. The nurses taking part in the evaluation were all experienced in applying compression bandages and all had positive reactions towards the ease of application and aesthetic appearance.

The successful use of a new compression system in treatment of ulceration of the lower limb associated with pyoderma gangrenosum. A case study.

Full Reference

Henderson V (2007) The successful use of a new compression system in treatment of ulceration of the lower limb associated with pyoderma gangrenosum. A case study. SAWC & WHS 2007, Tampa, Florida. April 28 - May 1, 2007.

Publication Type

Poster presentation.

Key Outcome Points

- Ulcer improvement seen within 7 days
- Several ulcers healed within 3 weeks
- Complete healing in 6 weeks
- Normal footwear for work commitments
- Cooler to wear
- Comfort
- Easy to apply
- Reduced slippage

Patient History

A single patient Case Study of a 49 year old gentleman with a history of atypical ulcers on his left leg which had been present for 2 years. The dermatology service had made a diagnosis of pyoderma gangrenosum and treatment including compression therapy was commenced. After 6 months the ulcers were healed and the patient was progressed into compression hosiery. However in only a few weeks ulceration recurred and compression bandaging was renewed with the new 3M™ Coban™ 2 Layer Compression System.



Initial assesment

A diagnosis of venous insufficiency was made after taking an ABPI and assessing the patient and their past medical history.

At initial accessment numerous small ulcers were present to the front and posterior of the shin on the left leg (Figure 1). Exudate level was high and odour was present. Wound beds were granulating 100%.

Four week assessment

At reassessment four weeks later the ulcers were almost healed and wound beds were covered with 100% granulation tissue (Figure 2). Exudate levels had reduced to moderate to slight and no odour was present.

Five weeks follow-up

After five weeks the ulcers were mostly healed (Figure 3). Surrounding skin continues to improve, exudate level is now slight and there is still no odour present.

Initial assesment



Figure 1

Four weeks assesment



Figure 2

Five weeks follow-up



Figure 3

Discussion/Summary

Within 7 days of commencing treatment with Coban 2 layer system the ulcers were reduced in size. After 3 weeks treatment in the new system many of the ulcers were healed. After 4 weeks the remaining ulcers continued to heal with only one ulcer on the posterior aspect of the shin still present. This was healed within the next 2 weeks of treatment at which time Mr L was measured and fitted with compression hosiery.

Conclusion

The use of the Coban 2 layer system in this patient proved to be very successful. Previously the patient had been concordant with other bandage systems, however he required a system that allowed him to wear normal footwear and thereby fulfil his work commitments. Mr L found that the Coban 2 layer system not only allowed him to wear everyday footwear, but was also cooler and more comfortable in the summertime.

So patient concordance was facilitated with the added bonus that the ulcers healed very quickly.

The author acknowledges that this is a single case study but this successful outcome shows that the Coban 2 layer system deserves further investigation.

Clinical effectiveness of the 3M™ Coban™ 2 Layer Compression System.

Full Reference

Kerr A and Hampton S (2007) Clinical effectiveness of 3M™ Coban™ 2 Layer Compression System (A series of case studies). SAWC & WHS 2007, Tampa, Florida. April 28 - May 1, 2007.

Publication Type

Poster presentation.

Key Outcome Points

- One patient healed in 4 weeks
- Generally wound conditions improved
- Comfort
- Improved concordance
- Wear time 6-7 days
- Never changed for slippage or loss of compression
- Easy to learn
- Successful in a variety of leg shapes

Methodology

22 Clinical evaluations were undertaken on the 3M™ Coban™ 2 Layer Compression System with 21 patients' included. Patients' wounds were assessed weekly, photographed and measured. Photographs were also taken of the bandage appearance at application and removal. Ankle measurements, Doppler assessment and subjective data such as odour and exudate levels were also recorded. Measurement and assessment were continued for a six week period.

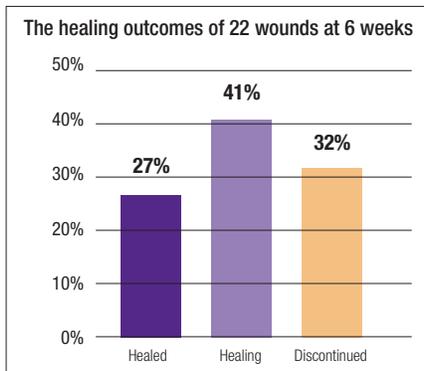


Figure 1

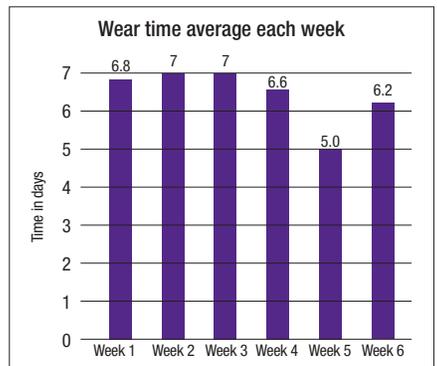


Figure 2

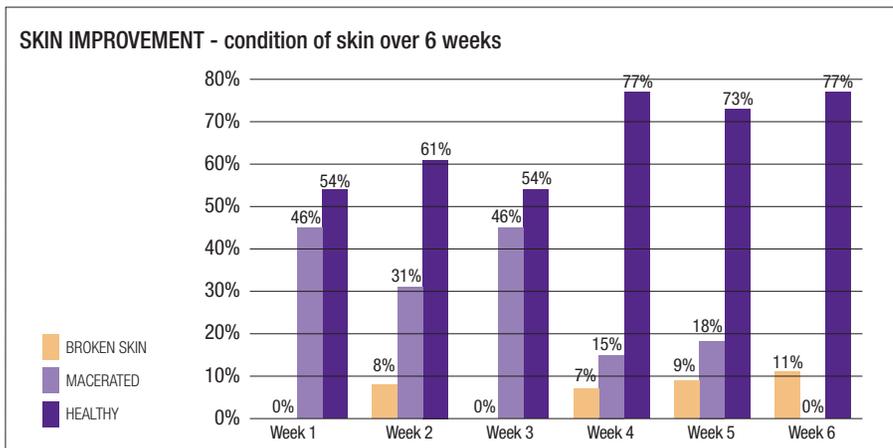


Figure 1

Results

7 wounds were discontinued for various reasons, all unrelated to the product being used. The healing status was recorded for the remaining 15 ulcers with 40% healing and 60% in a healing status at six weeks (Figure 1). At week 1, there was 8% heavy exudate strike through and 54% with no strike through. By week 6, there was no heavy strike through and 70% with no strike through at all (Figure 4).

Cost effectiveness of any dressing or bandage, can be judged by the length of time between dressing changes and an ideal bandage would remain in situ for 7 days. On average, the bandages were changed every 6 or 7 days (Figure 2). In no instances were bandages changed due to slippage or loss of compression.

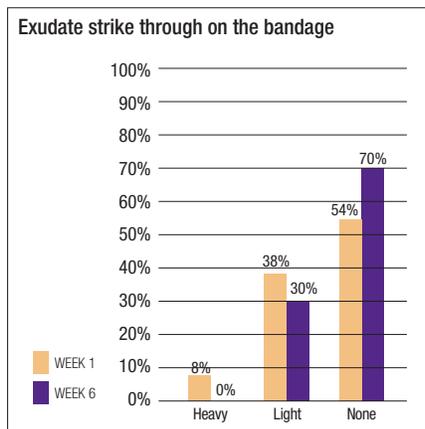


Figure 2

Conclusion

In general, wound condition improved and the wounds returned to a healing state. Notably, one patient of 92 years healed after only four weeks treatment with this new compression system. All patients found the Coban 2 layer system comfortable and this could be associated with improved concordance levels and requests for continuing therapy in this system.

3M™ Coban™ 2 Layer Compression System - an aid to patient concordance with compression therapy.

Full Reference

Brockwell F (2007) Coban 2 Layer Compression System; An aid to patient's concordance with compression therapy. The 17th Conference of the European Wound Management Association, Glasgow, 2-4 May 2007.

Publication Type

Poster presentation.

Key Outcome Points

- Significant reduction in ulcer size
- Patient 3 healed in 4 weeks
- Minimal slippage
- Improved comfort
- Improved ankle mobility
- Improved concordance

Methodology

The author has used the Coban 2 layer system to treat 9 patients whom through a variety of reasons failed to tolerate previous compression therapy. Three of these patients are discussed with photographic evidence demonstrating the improvements in leg ulcer status. All patients studied underwent a comprehensive leg ulcer assessment to exclude arterial aetiology and provided written consent for digital photography.

Results

Patient 3

This elderly lady had a shallow ulcer for 10 months measuring 2cm x 2cm, which was not healing (Figure 1). She refused any attempts at introducing compression but with negotiation she agreed to try Coban 2 layer system. The ulcer displayed clear signs of healing within 2 weeks of application and new epithelium was evident now measuring 1.5 x 1.5cm (Figure 2). This ulcer was healed at 4 weeks using Coban 2 layer system (Figure 3).

Patient concordance issues

- Fear of becoming immobile
- Ulcer pain
- Ulcer malodour
- Bandage bulk
- Cost of footwear
- Bandage appearance



Figure 1: Initial Assessment



Figure 2: Two Week Assessment



Figure 3: Four Week Assessment

Discussion/Summary

All patients studied had valid reasons to decline compression therapy. Eliciting these concerns enabled the author to engage patients in trying the Coban 2 layer system. The author concludes this system was able to deliver therapeutic levels of compression comfortably and with less bulk so that patients could wear normal footwear, which increased mobility and was less costly for the patient. Additionally this compression therapy system was tolerated during the warmer summer months as the patients all reported the system being less hot to sleep in. The author acknowledges that further health promotion and concordance with hosiery is required to prevent leg ulcer recurrence. The success of the Coban 2 layer system has enabled the author to proceed with discussions regarding preventative strategies.

What are benefits of the 3M™ Coban™ 2 Layer Compression System?

Full Reference

Kecejli-Leskovec N (2007) What are benefits of the 3M™ Coban™ 2 Layer Compression System? The 17th Conference of the European Wound Management Association, Glasgow, 2-4 May 2007.

Publication Type

Poster presentation.

Key Outcome Points

- Stable Static Stiffness Index at 12 hours
- Higher pressure stability at 12 hours
- A more consistent pressure profile over 12 hours of wear

Methodology

8 female patients (mean age 62 years) with chronic venous insufficiency were included in the study. Patients with severe diseases or those with ankle-brachial pressure index (ABPI) lower than 0.8 were excluded. Patients were divided in two equal groups. In the first group 3M™ Coban™ 2 Layer Compression System and in the second group Rosidal sys® compression systems were applied.

1. The interface pressure was measured at point B1 in supine and standing position 0.5h after application of bandages and 12 hours afterward using the Kikuhime® transducer.
2. The static stiffness index was calculated for both groups by subtracting the mean supine pressure from the mean standing pressure at each time point.

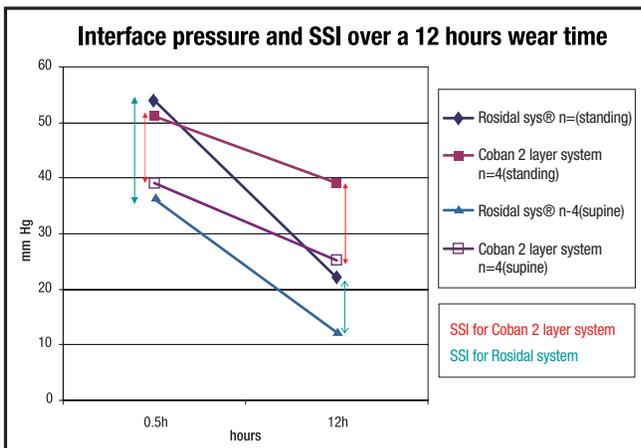


Figure 1: Mean sub bandage pressures over time measured supine and standing

Higher pressure stability

Average interface pressure				
n=4	Rosidal sys® n=4	SSI	3M™ Coban™ 2 Layer System	SSI
Standing 0.5h	54 ± 2.6 mmHg	↑ 18	51 ± 7.2 mmHg	↑ 12
Supine 0.5h	36 ± 4.4 mmHg	↓	39 ± 7.9 mmHg	↓
Standing 12h	22 ± 2.0 mmHg	↑ 10	39 ± 4.3 mmHg	↑ 14
Supine 12h	12 ± 2.3 mmHg	↓	25 ± 7.5 mmHg	↓

Conclusion

When comparing the results from these two compression systems, we conclude that both exhibit the properties of a high stiffness or inelastic bandage system. However, the Coban 2 layer system has the advantage of delivering a more stable SSI and better pressure stability 12 hours after application.

Patient comfort and ease of use of a new 3M™ Coban™ 2 Layer Compression System for venous leg ulcers: A multi-centre case study analysis.

Full Reference

Post H, Ruigrok W, vanLeen M, Timm K and Nellestein T (2007) Patient comfort and ease of use of a new two-layer compression system for venous leg ulcers: A Multi-centre case study analysis. The 17th Conference of the European Wound Management Association, Glasgow, 2-4 May 2007.

Publication Type

Poster presentation.

Key Outcome Points

- Easy to learn and faster to apply
- High level of comfort
- Reduced pain
- Easier to wear own shoes
- Improved mobility in 60% of cases
- Improved concordance in over 90%
- 7 day wear in 85% of cases
- Fast oedema reduction

Methodology

A multi-centre study was conducted with 32 patients suffering from venous leg ulcers and an ABPI >0.8. All patients included had previously experienced other types of compression systems. For a six week period, patients were assessed weekly. At each visit their leg ulcers were photographed and measured to record wound healing rate. Circumference of the ankle and calf were measured to record oedema reduction. The bandage height from floor to the top of the bandage was measured and recorded at arrival before bandage change and after application of a new bandage, to assess slippage. The patients' experiences of 3M™ Coban™ 2 Layer Compression System were recorded after the six week period.

Case study 1:



Day 1



Day 7: before removal



Day 49: wound is closed

Case study 2:



Day 1



Day 18: after 7 day wear



Day 49

Results

The Coban 2 layer system was found to be very comfortable by the majority of the patients, compared to other bandage systems, like short stretch and multilayer. Shoe fitment and improved mobility was seen in 60% of the cases. As a result of this, an improved adherence level could be observed. Clinicians found the Coban 2 layer system easier to apply than other bandage systems in 45.5% of cases. In 44.8% of cases they found it as easy to apply as other bandage systems (Figure 1). The bandages had stayed in place for one week in 85% of cases. In addition, a high level of patient concordance, with over 90% of patients leaving their bandages in place, as well as a fast oedema reduction was observed.

Ease of Application

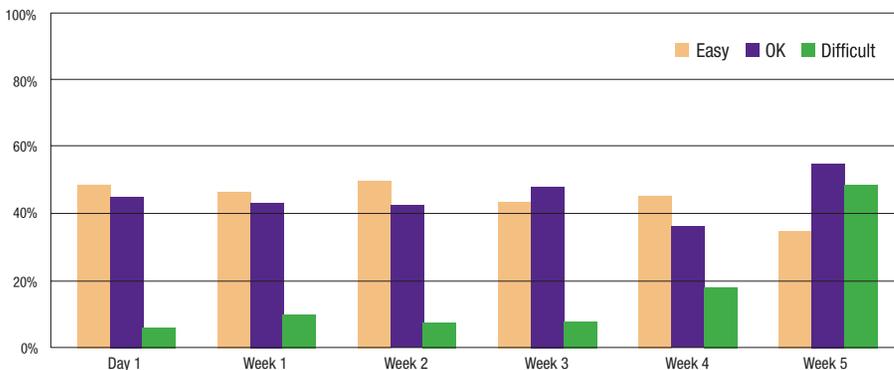


Figure 1

Patients' Experiences



Figure 2

Conclusion

When compared to other compression bandages, such as short stretch and multilayer systems, the Coban 2 layer system application technique was easy to learn and faster to apply. Compared to previously used systems, patients reported a high level of comfort and reduced pain. It was easier to wear own shoes and the ability to walk was improved. As a result the patients in this case study demonstrated a high level of concordance with this bandage system.

Progression of wound healing and patient quality of life with a new 3M™ Coban™ 2 Layer Compression System

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Full Reference

Walker D and Treadwell T (2007) Progression of wound healing and patient quality of life with a new, 2 layer compression system. SAWC & WHS 2007, Tampa, Florida. April 28 - May 1, 2007.

Publication Type

Poster presentation.

Key Outcome Points

- Faster to apply and remove
- Comfort
- Less slippage when compared to 4-layer
- 7 day wear
- Improved HRQOL – activities of daily living
- Reduced sleep disturbance
- Reduced pain
- As effective as 4-layer in managing oedema and clinical condition

Methodology

This clinic participated in a randomised, controlled study of crossover design comparing the product performance and patient quality of life with a 2 layer* and a 4 layer** compression system. All patients were in compression prior to enrollment.

- 8 weeks of treatment (4 weeks with each product, randomised)
- Performance attributes measured included:
 - Wear time
 - Bandage slippage
 - Mobility
 - Wound area measurements
 - Quality of Life Questionnaire (QoL) completed at enrollment, crossover, completion
 - Patient preference obtained at study completion
- Crossover study was designed to validate that the new 3M™ Coban™ 2 Layer Compression System provided effective compression while meeting patient-centered needs.

The following cases demonstrate the progress of wound healing and discuss the differences in QoL scores.

*Coban - Coban is a trademark of the 3M Company.

**Profore - Profore is a trademark of Smith & Nephew Limited.

Results

Patient 1

Though patient has a resistant, slow to heal ulcer, he rated his overall quality of life a 9/10 at all 3 time points. He reported that the 2 layer system was more comfortable overall, and he experienced less slippage.



Patient 2

The first 4 weeks show rapid response in wound area reduction. Patient stated he loved the new Coban 2 layer system. A skin erosion occurred at week 6, possibly due to slippage of 4-layer system.

QoL attributes reported by patient to have improved while wearing the Coban 2 layer system included less sleep disturbance, less pain from the wound site, and improved ability to perform activities of daily living.

Patient very pleased and said that the Coban 2 layer system was by far the most comfortable compression system that he'd ever been in. The wound made excellent progress.



Patient 3

Patient reported that he liked wearing the Coban 2 layer system for its durability and comfort, though he selected the 4-layer as his preferred system for its warmth properties.



Discussion

- As willing participants in a clinical trial, each subject adhered to the protocol and experienced wound healing progress due to effective compression.
- The Coban 2 layer system was as effective as the 4 layer system in reducing oedema and managing the clinical condition.
- QoL scores were difficult to interpret with only 3 subjects. Interpretation requires analysis of the full 80 patient data.
- The Coban 2 layer system provided these patients with comfortable compression and 7 day wear time with minimal slippage.
- Both the patients and clinician reported that the Coban 2 layer system was faster to apply and remove which was appreciated in the busy clinic.

Comparison of patient satisfaction and effectiveness between two methods of gradient compression dressings.

Full Reference

Larson-Loehr V, Kimbrell P and Rios E P (2007) Comparison of patient satisfaction and effectiveness between two methods of gradient compression dressings. SAWC & WHS 2007, Tampa, Florida. April 28 - May 1, 2007.

Publication Type

Poster presentation.

Key Outcome Points

- Cost effective
- Maintained healing rates of 90% at 5.1 weeks with the 3M™ Coban™ 2 Layer Compression System
- Comfort
- Improved and easier application features – time to apply markedly reduced and less product usage
- Patient satisfaction higher – temperature, mobility and concordance
- Patient perception – effective at controlling oedema

Methodology

- The evaluation process requires involvement of both staff and our patients.
- Each completes an independent survey tool at the initial application and then completes it at the return visit.
- All survey questions compare the evaluation product to the current product.
- Staff responses are also rated using a Likert Scale (1= unsatisfactory 4 = excellent).
- Patient responses are rated using a Likert Scale (1=unsatisfactory 5= excellent).

This evaluation was conducted with 21 patients who were currently using a four layer system. All patients gave consent before participation.



Results

The patient was asked to rate their experience of the new Coban 2 layer system and their previous 4 layer bandage on the following criteria:

Temperature - Mobility - Appearance - Effectiveness - Thickness

Patient Survey Results

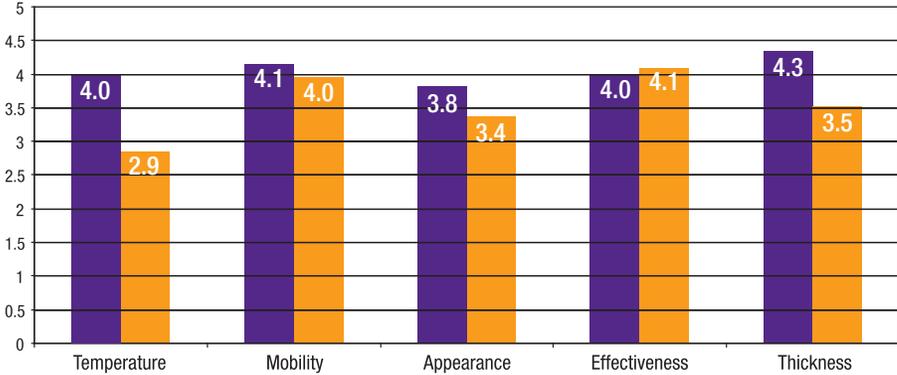


Figure 1 **1 = Unsatisfactory 5 = Excellent**



2 Layer System Compared to Current product

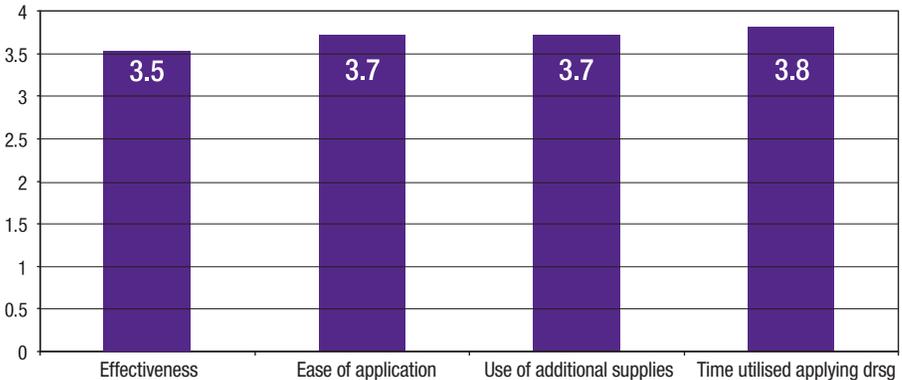


Figure 2 **1 = Unsatisfactory 4 = Excellent**

Discussion/Summary

- Patient satisfaction was high for the Coban 2 layer system in the area of temperature, mobility and compliance.
- Patient perception was that overall the Coban 2 layer system was more effective in controlling their oedema.
- Staff time for application was markedly decreased, application easier, and less product used in comparison to 4 layer system.
- 2 layer system was cost effective.
- Our center was able to maintain healing outcomes of 90% at 5.1 weeks.

It's a wrap . . . evaluating a two layer modified short-stretch compression system.

Full Reference

Pearson C, Sterling W and Keast D (2007) It's a wrap Evaluating a two layer modified short-stretch compression system. SAWC & WHS 2007, Tampa, Florida. April 28 - May 1, 2007.

Publication Type

Poster presentation.

Key Outcome Points

- Improved comfort and reduced pain
- Less bulky
- Less slippage
- Able to wear regular shoes
- Concordance
- 90% healed or improved ulcer condition
- Easy to learn
- Easy to apply

Methodology

10 clients were evaluated in two Canadian ambulatory wound care clinics (6 in London, Ont., 4 in North Vancouver, BC).

Frequency of assessment varied by clinic location and resources. Clients were seen weekly in the clinic for dressing changes in North Vancouver. Clients were seen weekly to monthly for dressing changes with Home Care nursing involvement in London. At each visit the wound bed was assessed, length and width measurements were taken and surface area was calculated.

Wounds were photographed weekly in North Vancouver and at initial and final visits in London. Client satisfaction parameters were assessed at each visit. Satisfaction parameters included pain, numbness, wrap slippage and bulk.

Compression wrap change frequency varied from every 4 to 7 days.

Previously the patients in this evaluation had been intolerant of compression therapy.

*PLEASE NOTE: Two Layer modified short stretch system was the author's description of the 3M™ Coban™ 2 Layer Compression System.

Case Study

Initials	JM
Age	65
Sex	Female
Initial ulcer Size (cm ²)	9.8 cm ²
Final ulcer	1.4 cm ²
Age of ulcer on first visit	12 months
Previous treatment	- 4 layer
Primary dressing	Silver-Gauze
Ulcer closed	
Comments	This is great I forget that I even have it on. Finally something that works.



Initial visit:

- This ulcer measures 9.8 cm².
- Client has had this ulcer for a year.
- We started her in a 4 layer system.
- Client complained of it (4 layer system) being too hot and bulky and it bunched at her ankle.



Six weeks later:

- Ulcer almost gone.
- Client very happy with the new bandage.
- She said "Finally something that works. It is great and I forget I even have it on".

Results

Nine out of ten clients (previously intolerant to compression) were able to wear the new Coban 2 layer system. In general, clients stated that this system was more comfortable and less bulky than other systems. They experienced less slippage with the Coban 2 layer system and were able to wear their regular shoes. They also experienced less pain and no numbness with the two layer system. Most clients were able to return to their normal activities of daily living. Nine out of ten clients' wounds healed or improved with this system. Mean initial surface area of the ulcers was 18.3 cm². Final mean surface area at three-month follow-up had decreased to 3.3 cm².

Three of 10 clients' wounds had completely closed in the 12-week evaluation period and 6 of 10 showed significant reduction in wound size. The compression system was easy to apply and Home Care nurses were easily taught correct and consistent application techniques. In this case series, this novel two layer wrap was an effective, comfortable compression system that patients were willing to wear.

Discussion/Summary

- The new modified short stretch compression system* is well tolerated by patients
- There is minimal slippage and bulk
- Consistent application of the modified two layer short stretch compression can be easily taught.

Will quality of life and patient comfort improve with a new 2 Layer Compression Bandaging System?

Full Reference

McIntosh A, Galvan L and Barkauskas C (2007) Will quality of life and patient comfort improve with the new 2 Layer compression bandaging system? SAWC & WHS 2007, Tampa, Florida. April 28 - May 1, 2007.

Publication Type

Poster presentation.

Key Outcome Points

- Less slippage
- Improved comfort
- Cooler to wear than 4-Layer
- Less interference with footwear
- Less interference with sleep
- Improved HRQoL scores
- Faster to apply and remove
- Shorter clinic visits

Methodology

The three patient cases presented on this poster are a subset of a larger 80 patient random crossover study comparing 2 compression systems. The patients were studied for an 8 week period, with 4 weeks in each compression system. This poster reports the change in the patient's quality of life as measured using the Cardiff Wound Impact Schedule. Patients were asked to complete the questionnaire over the course of their treatment and this poster reports the change in their scores over the period of wearing the 3M™ Coban™ 2 Layer Compression System.

Results

Case Study

48-year-old female with a 70-week history of venous insufficiency and obesity. Seen in outpatient wound clinic for 23 weeks for multiple, full thickness wounds with minimal success in spite of adherence to a variety of compression methods and wound treatment.

Wound progress during first 4 weeks of 4-layer system



Slippage during Wear was 11.0 cm/wk. Very uncomfortable, and proximal oedema was difficult to wrap.



Visit 1/week 1 - after application



Visit 2/week 2
return visit



Visit 4/week 4 - return visit

Wound Progress during last 4 weeks with 2-layer system



Visit 5/week 5



Visit 6/week 6



Week 8 - wound area =53cm²

Slippage during wear – 4.5 cm/wk



Visit 6/week 6 - after application



Visit 7/week 7 - after visit



Visit 7/Week 7 - after application

This patient requested continuation in the Coban 2 layer system after the completion of the 8 week study.

She could wear normal shoes and was more comfortable. Overall quality of life scores improved:

5 (baseline), 6 (week 4), and 8 (week 8). Wound healing progress continued. See photos below.



Discussion/Summary

Because these subjects were wearing high compression systems during the 8 week study, all experienced wound healing progress.

Several benefits were experienced by all 3 subjects while wearing the new Coban 2 layer system, including:

- Less slippage
- Improved comfort during wear
- Less sleep disturbance
- Less interference with footwear.

All patients noted that their clinic appointment time decreased due to the easier removal and application of the Coban 2 layer system. Two patients also acknowledged that the bandage system was “cooler than the 4 layer bandage and not as itchy”.

The use of 3M™ Coban™ 2 Layer Compression System in the treatment of venous leg ulceration.

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Full Reference

Powell G (2007) The use of Coban™ 2 Layer Compression System in the treatment of Venous Leg Ulceration. Wounds UK 2007 Wound Care Conference, Harrogate, 12-14 November 2007.

Publication Type

Poster presentation.

Key Outcome Points

- Positive patient experiences – quality of life
- Increased comfort
- Improved patient confidence
- Safety – improved stability when mobilising
- Lightweight
- Able to wear normal footwear
- Quick and simple to apply
- No slippage
- Rapid healing

Methodology

Resting Doppler pressures were recorded in conjunction with a full comprehensive leg ulcer assessment.

ABPI 0.8 with biphasic sounds except for the dorsal pedis which had monophasic sounds. Bandage measurement and photographs were obtained immediately following application of the Coban 2 layer system and again prior to removal to establish slippage levels throughout wear time. Wounds were measured and photographed at each bandage change.

Case Study

AP is 80 years old with bilateral leg ulceration unusually to the posterior malleolus area of both legs. Following an episode of cellulitis responsive to antibiotic therapy, the ulcers unfortunately became persistent. Both ulcers were initially covered 100% with slough of varied depth and produced copious volumes of exudate. The location of the ulcers above the heel area also proved a challenge when managing the high exudate levels. The ulcers measured 3cm x 1cm on the right leg and 3cm x 3cm on the left leg. Having experienced ulceration for 9.5 weeks on the left leg and 5 weeks on the right leg, AP was keen to try a new treatment to aid healing. Based on previous experience AP was keen to try alternatives to multilayer bandage system as their previous experience was of slippage and bulk causing them discomfort.

AP is an ex-smoker of 4 years with left ventricular hypertrophy and a heart murmur.

Ankle movement to both legs is reduced and AP walks with two sticks following right and left total knee replacements and a left hip replacement for osteoarthritis. A DVT to the left leg was also sustained in 2000. Pain is controlled with paracetamol, dihydrocodeine or ibuprofen depending on severity.



Figure 1



Figure 2

Results

During three cycles of weekly bandage changes the right leg improved rapidly and healed. Due to copious exudate levels requiring twice weekly bandaging and infection (MRSA and Pseudomonas) the left leg (Figure 1) proved more problematic. Coban 2 layer system was discontinued for 4 weeks to allow daily skin care and topical applications to be applied, a long stretch system was used in the interim. After 13 weeks and following the re-introduction of the Coban 2 layer system, this difficult leg ulcer was healed.

Discussion/Summary

Coban 2 layer was quick and simple to apply. The patient was positive about their experience commenting on how light the system is to wear. No slippage was observed during wear time. The patient's normal footwear was easy to slip on over the lower profile system and no rucking of the bandages was observed. The rapid healing of the right leg and subsequent healing of the left leg following the treatment of infection indicates that Coban 2 layer system is an effective treatment for venous leg ulcers and a valid alternative to multilayer systems.

Chronic venous ulcers . . . Compression therapy treating the cause - a case study.

Full Reference

Naude L (2008) Chronic Venous Ulcers Compression therapy treating the underlying cause – a case study. Professional Nursing Today. Volume 12, No 1 (2008) pp 25-28.

Publication Type

Published Case Study

Key Outcome Points

- Wound healing
- Positive psychosocial effects
- Concordance to treatment
- Cost saving

Background

A case study of a 38 year old male with a 12 year history of bilateral leg ulcers, despite various treatment regimes. This study follows the patient over a three month period of compression therapy with the 3M™ Coban™ 2 Layer Compression System

Methodology

Both legs were initially dressed with a 20% hypertonic saline gauze and the Coban 2 layer system. Compression bandages were changed weekly and the wound was measured at each change. After one month a hydrocolloid was introduced to the ulcer on the right leg beneath the compression bandage.



Figure: 1 Left leg - commencement of treatment



Figure: 2 Left leg - ulcer condition after 3 months

Results

Wound closure occurred within three months of commencing treatment with the Coban 2 layer system. Positive psychosocial effects and concordance to treatment were noted. The patient is now able to wear their own footwear and has progressed to wearing a Type II compression stocking on the right leg to prevent further recurrence.



Figure 3: Right leg - commencement of treatment



Figure 4: Right leg - ulcer condition after 3 months

Full Reference

Robins R and Mc Cullum D (2008) Compression Therapy: How Many Layers?
Poster presentation at 18th conference of the European Wound Management Association, Lisbon, 14-16 May 2008

Publication Type

Two Case Studies presented at EWMA Lisbon

Key Outcome Points

- Wound dimension reduction within 6 weeks in all subjects
- Healing rates comparable to 4 layer
- Improved quality of life
- Extremely comfortable and aesthetically pleasing
- Reduced slippage – in active patients
- Ability to wear own footwear
- Easy to use
- No bandage trauma or adverse events

Methodology:

The method involved a clinical study of six patients over a six week period using the 2 layer compression therapy system.

Selection criteria included:

- A Doppler assessment with an ABPI \geq 1.0.
- Ulceration must have been present for at least six months.
- Each patient already using or tried a four layer compression therapy system.

Results were recorded weekly and included:

- Digital photography, wound measurement.
- Limb circumference, bandage appearance, Floor to top bandage height to assess slippage.
- Exudate strikethrough, patient concordance.

Any adverse incidents were recorded.

Results

Wound dimensions in all patients reduced during the six week study.

Evaluations showed that the healing rates using a 2 layer system were comparable to that of a 4 layer system. However, the marked benefit of using the Coban 2 layer system was an overall improvement in the patients' quality of life.

Such was the improvement in the patients' wounds that use of the Coban 2 layer system was continued after the study period. Figures 1-3 overleaf document the progress of one patient's wound through to healing 5 months after commencement of treatment.

Patient feedback was very individual but general consensus was:

- The bandage was extremely comfortable
- The cohesive nature of the system appeared to reduce slippage of the bandage, particularly in the active patient
- The low profile of the system gave the patient the ability to wear their own footwear with ease

From a clinician's perspective:

- The system comes in one size that fits all
- Easy to apply and to remove
- Aesthetically pleasing
- Reduction in slippage allowed the correct level of graduated compression to be maintained between dressing changes thus aiding in the management of exudate and Lymphoedema
- No adverse incidents including bandage trauma was found during the study period



Figure 1:
Initial presentation of wound Leg washed with tap water, emollient applied and primary wound contact silver impregnated dressing applied to reduce bacterial burden. Coban 2 layer compression system applied.



Figure 2:
3 month follow up - Wound measurement 0.9cm x 1cm. Continued with Coban 2 layer compression system.



Figure 3:
5 month follow up - Ulceration fully healed. Compression hosiery applied.

Discussion/Summary

The authors found that healing rates were apparently comparable between both traditional 4 layer compression therapy systems and the Coban 2 layer system. However, due to the vast improvement in patients' quality of life and concordance with the Coban 2 layer system, one would suggest that if a further, larger, study was undertaken concentrating on healing rates alone, an improvement may be noted.

A randomised controlled 8-week crossover clinical evaluation of the 3M™ Coban™ 2 Layer Compression System versus Profore™ to evaluate the product performance in patients with venous leg ulcers.

Full Reference

Moffatt CJ, Edwards L, Collier M, Treadwell T, Miller M, Shafer L, Sibbald RG, Brassard A, McIntosh A, Reyzelman A, Price P, Kraus SM, Walters S-A, Harding K.

A randomised controlled 8-week crossover clinical evaluation of the 3M™ Coban™ 2 Layer Compression System versus Profore™ to evaluate the product performance in patients with venous leg ulcers.

International Wound Journal 2008;5:267-279.

Publication Type

Published randomised, controlled trial.

Key Outcome Points

- Significantly less slippage with the Coban 2 layer system
- Wear time of 7 days
- Comparable wound healing
- Improvements in HRQoL when wearing Coban 2 layer system
- Strong patient preference for the Coban 2 layer system

Methodology

Central and local ethics approvals were obtained and written informed consent obtained.

Participants needed to be at least 18 years of age in the UK, be able to understand the questionnaire and have been treated with compression for at least two weeks prior to entry to the study, ABPI < 0.8 excluded.

Participants were randomised to one of two bandage treatments (name C2L* and P4**) and followed for 4 weeks. Their treatment was switched to the other compression system for a further 4 weeks and followed for a total of 8 weeks or 9 clinic visits. Participants acted as own control.

Primary endpoint of this study was slippage, measured from the top of the bandage to the floor post application and prior to removal. Five secondary endpoints of this study were, bandage wear time, wound healing – measured by tracing, HRQoL using the Cardiff Wound Impact Schedule, patient preference and mobility using pedometer.

* Coban 2 layer system

** Profore, Smith and Nephew Ltd

Estimated bandage slippage

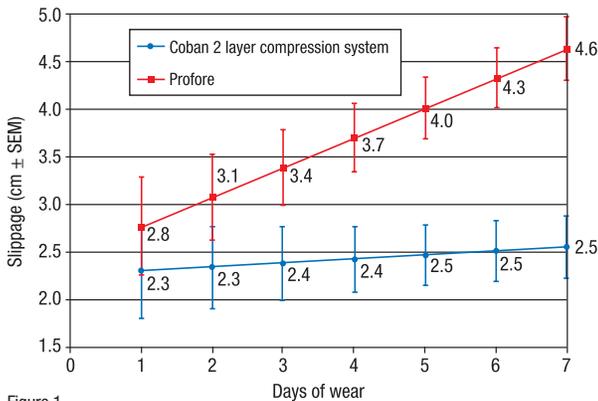


Figure 1

Figure 1: Statistical model estimate of bandage slippage (centimetre standard error of the mean) recorded during 697 bandage changes from 81 subjects. Slippage was significantly different lower in the Coban 2 layer system at days 3–7 ($P, <0.001$).

Results

81 participants were enrolled into the study.

Bandage slippage was significantly ($q < 0.001$) different in favour of the two-layer system at 3–7 days. Measures of mobility between these groups was not significantly different.

In both compression groups the bandage was worn for the full 7 days in 98% of visits. No significant difference in wear time ($q = 0.721$)

No significant differences in wound healing endpoints were found (Figure 2). Median percentage area change ($q = 0.88$).

A significant difference in favour of the two-layer compression system during the pre-crossover period for physical symptoms and Daily Living scores was found ($q < 0.05$). 68 subjects stated their preference between the compression systems, 72% preferred the two-layer system versus 22% for the four layer system. Results were similar despite randomisation order.

Discussion/Summary

The study results clinically confirmed that the new two-layer system exhibited less slippage during wear than the four layer system and this possibly resulted in greater improvement in physical symptoms and daily living scores.

It is also possible that the decreased slippage combined with less bulk resulted in improved comfort, concordance and the ability for patients to wear their normal clothing and shoes which may have contributed to the strong patient preference for the two-layer system.

There were no statistical differences in wound healing in this crossover study, this hypothesis is currently being investigated in a separate study.

Wound healing - results

Proportion healed during Period 1			
	Not Healed	Healed	Total
Coban 2 layer compression system	32 (84%)	6 (16%)	38 (48%)
Profore	38 (93%)	3 (7%)	41 (52%)
Total	70 (89%)	9 (11%)	79

No Significant difference between treatments ($p=0.47$)

Figure 2

Positive Experience of UK Patients and Clinicians with a Novel Two Layer Compression System: A Multi-site Case Series

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Full Reference

Positive Experience of UK Patients and Clinicians with a Novel Two Layer Compression System: A Multi-site Case Series. Oral presentation at the 3rd Congress of the World Union of Wound Healing Societies. Toronto, June 4-8, 2008.

Publication Type

Oral presentation – Delivered by Claire Stephens (on behalf of the investigators). World Union of Wound Healing Congress. Toronto. June 2008. Pending further publication.

Key Outcome Points

- Positive wound area reduction and healing
- Skin condition and peri wound
- Wear time
- Exudate management
- Oedema control
- Slippage
- Comfort
- Footwear
- Mobility
- Appearance and preference
- Ease of use
- Conformability
- Concordance

Methodology

85 patients at 14 UK study sites completed a six week evaluation of the 3M™ Coban™ 2 Layer Compression system to identify clinical value and patient acceptance.

All patients had an ABPI of >0.8, with varying history of leg ulceration. Wounds that were treated had been present for a range of 1 – 192 months. The outcomes recorded were as follows:

- Wear Time
- Exudate Management (strikethrough)
- Wound Size and Condition
- Bandage Slippage
- Patient Views- Aesthetics, comfort and footwear
- Clinical Views – Ease of use and concordance

Results

The average wound area reduction over the six week study period was found to be 41%, with 18 patients progressing to full healing. Optimal wear time for a compression bandage is considered to be 7 days and this was observed in 72% of cases, with the average duration being 6.3 days. Patients and clinicians felt positive about the 2 layer system's ability to manage exudate in 83% of cases. Effective oedema reduction was observed at both the ankle and calf and the bandage slippage was less than 2 centimetres in 75% of cases. Patients and clinicians were also asked to give their opinions on their experience with the bandage, results are described overleaf.

Patient Views

- 81% responded positively about bandage appearance
- 88% found the Coban 2 Layer system comfortable
- 80% positive responses about its ability to resist slippage and sagging
- 78% of patients were able to wear their normal footwear
- 73% found it easier to walk in the Coban 2 layer system

Clinician Views

- 62% of clinicians found the system to be easy to apply
- Conformable to awkward shaped limbs
- Skin integrity maintained or improved
- 90% found the system easy to remove
- Patient concordance was observed in 98% of cases

Overall, clinicians felt that the Coban 2 layer system was a valuable addition to the treatment options in the compression portfolio.



Figure 1 – Commencement of treatment



Figure 2 - Week 3



Figure 3 – Week 10



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