Sub-bandage pressures and comfort in a lymphoedema bandaging system with a foam layer and cohesive short stretch bandage

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Introduction

Patients with Stage IIb and III lymphoedema often have severe hyperkeratosis, fibro-sclerotic changes and fat accumulation *(ISL 2009)*. Tissue thickening may alter the nature of sub-bandage pressures. The type of padding layer also influences the stiffness of a bandage system *(Mosti et al. 2008)*. It is suggested that people with severe lymphoedema may require, and tolerate, high sub-bandage pressures *(Partsch 2007)*. However, more evidence is required to inform clinical practice in using different bandaging components in patients with long-standing lymphoedema.

Method

Aims

To determine sub-bandages pressures, static stiffness indices, amplitudes and comfort provided by a bandaging system comprising a foam bandage roll, and cohesive short-stretch bandages, in healthy volunteers and people with late-stage lymphoedema.

Recruitment

Healthy volunteers were taken from a local population. Patients with lymphoedema were recruited from an independent lymphology clinic in the UK. A screening form was used to determine suitability for bandaging. Each participant provided informed consent.

Sample

Eighteen healthy volunteers (mean 53 years) and six individuals with late-stage lymphoedema (mean 57 years).

Intervention

A bandaging system was applied by experienced lymphoedema nurses. Volunteers had a below-knee bandage; patients had a full leg bandage. All were worn over a 24 hour period. System components were: a 4cm conforming toe bandage*; spiral application of foam roll** (10cm/12cm width) with minimal overlap; figure-of-eight application of cohesive short stretch bandages+ (8cm/10cm/12cm width as required). All healthy volunteers and patients continued with normal activities.

Measurements

A sub-bandage pressure monitor♦ was used to determine sub-bandage pressures *(Partsch et al. 2006)*. A sensor was applied to the B1 point on the leg, attached to the monitor by a thin plastic tubing. These were connected to a laptop to record:

- Pressures in supine position, and standing position after bandage application, and at 24 hours
- Calculation of Static Stiffness Index (SSI), the difference between supine and standing, after application and at 24 hours. Amplitudes that indicate variations in pressure on movement were also recorded.

Comfort and tolerability were measured after application and at 24 hours using a series of self-rating scales.

Results

AT APPLICATION	Mean pressures (supine position)	Mean pressures (standing position)	Mean SSI
Healthy volunteers n = 18	69mmHg (range 44-85mmHg)	87mmHg (range 49-128mmHg)	19 (range 4-43)
People with lymphoedema n = 6	65 mmHg (range 60-71mmHg)	82 mmHg (range 68-98mmHg)	16 (range 8-36)

At 24 HOURS	Mean pressures (supine position)	Mean pressures (standing position)	Mean SSI
Healthy volunteers n = 18	42mmHg (range 29-52mmHg)	58mmHg (range 37-82mmHg)	17 (range 6-30)
People with lymphoedema n = 6	32 mmHg (range 22-39mmHg)	47mmHg (range 29-65mmHg)	15 (range 7-26)

Comfort, tolerability and slippage

The bandage system was generally well tolerated in healthy volunteers and individuals with lymphoedema. After 24 hours, nine healthy volunteers reported a degree of discomfort, which is not unexpected as they were unused to wearing bandages. However, all continued wearing the system over 24 hours, no pain was reported although two volunteers reported sleep disruption. On bandage removal there was no reported tissue damage in volunteers or patients.

Discussion

The sub-bandage pressures in healthy volunteers and people with lymphoedema were relatively high, particularly at application, but were generally well tolerated, even at night. This suggests that this system may be suitable for people with tissue thickening, as it provides pressures that may be clinically effective in reducing lymphoedema, while remaining comfortable. After 24 hours, the supine pressures had reduced by 39% in volunteers. In those with lymphoedema, pressures had reduced 51%, presumably due to reduction in limb volume *(Damstra et al. 2008)*.

SSI calculations were nearly all above 10, as would be expected from a short stretch system. However, three healthy volunteers and one person with lymphoedema had an SSI of < 10 after application. Anecdotal observations indicated that these individuals had soft, fatty tissues, which may have altered the bandage action, reducing the variations between supine and standing pressures.

Many of the healthy volunteers and individuals with lymphoedema continued with activities such as walking, dancing, cycling, driving and using footwear such as wellington boots, with minimal bandage slippage.

Conclusion

The sub-bandage pressures appeared high, but the system was well tolerated, indicating this system may provide clinical effectiveness in those patients with long-standing lymphoedema and tissue changes. This system provides further choice for practitioners and patients. Further work to evaluate the effectiveness in terms of reducing lymphoedema volume and managing symptoms is ongoing. Additional studies are required to investigate the influence of tissue condition on sub-bandage pressures and SSI.

References

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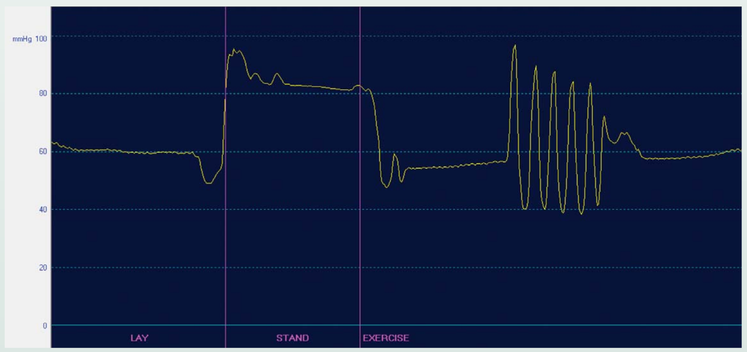

Good amplitudes of the system indicating short stretch performance.


Toe bandaging and foam padding


Full leg bandaging on a patient


Patient wearing normal clothing and footwear over the bandages

* Mollelast® Conforming Bandage ** Rosidal® Soft Foam Padding + Actico® Cohesive Inelastic Bandage - All these products are available from Activa Healthcare Ltd. ♦ The Picopress available from MicroLab

Wounds UK Conference, Harrogate 2013.

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