Factors that affect concordance with compression therapy

In treating leg ulcers, practitioners must assess not only the ulceration, but also the patient’s general health and their experience of past treatments in order to choose the therapy system that best meets the patient’s health needs and lifestyle.

Practitioners frequently report that patients with leg ulcers have difficulty adhering to treatment, although the extent of this remains unknown. Concordance with therapy is a complex subject and extends beyond the traditional definition of compliance, described by Haynes1 as: ‘The extent to which a person’s behaviour (in terms of taking medications, following diets or executing lifestyle changes) coincides with medical or health advice.’

Research has failed to identify any common demographic or patient characteristics associated with poor concordance with therapy.2 This is not helped when professionals are frequently judgmental about patients who do not adhere to treatment. Fineman3 stated: ‘It is reasonable to suggest that non-compliance is not the neat, objective diagnostic label that biomedicine claims, rather it is better understood as a complex, subjective, provider created category of unacceptable behaviour.’

Many factors affect concordance with treatment.4 This paper focuses on how the practitioner can provide effective care for patients with leg ulceration and discusses how the choice and application of compression therapy can influence concordance.

Assessment and concordance

Comprehensive ongoing assessment must be the clinician’s priority. While a full description of the process is beyond the remit of this article, the key issues (Table 1) are discussed. The clinician should:

- Understand the patient’s attitudes to and beliefs about compression, particularly if there have been previous episodes of failed treatment
- Assess pain and other symptoms associated with compression
- Identify the degree to which the patient wishes to be involved in their care, including the adoption of self-care regimens
- Ensure the correct choice and application of compression.

Practitioners often find it difficult to deal with patients who do not follow their treatment regimens,6 and labelling the patient as difficult, and blaming them for the lack of progress, is often reported in clinical practice.7 Improving concordance requires a sensitive, therapeutic relationship with the patient and a willingness to recognise the problems experienced by the patient day to day.8

Choosing an appropriate regimen

A review on compression therapy by the Cochrane Wounds Group came to the following conclusions:9

- That high compression (35–45mmHg) was more effective than low compression (15–25mmHg)
- That elastic or inelastic multilayer systems were more effective than single-layer systems.

The lack of research as to the best system to use with specific groups of patients means practitioners are reliant on pragmatic clinical opinion. Elastic bandages apply a continuous level of sustained compression with little variation in pressure over time; inelastic bandages, which do not contain

Table 1. Factors that affect patient concordance with compression therapy

<table>
<thead>
<tr>
<th>Comprehensive assessment — goal: to identify the issues that affect adherence to compression therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the aetiology</td>
</tr>
<tr>
<td>What is the patient’s previous experiences of compression?</td>
</tr>
<tr>
<td>Does the patient have symptoms such as pain, sleep deficit, depression and anxiety? Does the patient experience social isolation?</td>
</tr>
<tr>
<td>Is there concurrent illness, reduced mobility and/or is the patient unable to go to bed at night?</td>
</tr>
<tr>
<td>Assess the patient’s knowledge and likely involvement in care</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relationships — goal: to establish a therapeutic relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid judgmental attitudes and blaming the patient</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment — goal: to apply the appropriate compression system according to the patient’s needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure that skin-care regimens and dressings are used appropriately to avoid symptoms such as irritation, odour and maceration</td>
</tr>
<tr>
<td>Apply padding to protect the limb and to absorb exudate</td>
</tr>
<tr>
<td>Apply compression, taking account of the shape of the limb</td>
</tr>
<tr>
<td>Continuously evaluate the compression and address patient issues</td>
</tr>
<tr>
<td>Ensure all staff are skilled in the application of compression</td>
</tr>
</tbody>
</table>

C.J. Moffatt, PhD, MA, RN, Professor of Nursing, Thames Valley University; Director; Centre for Research and Implementation of Clinical Practice; Nurse Consultant, Leg Ulcer Service, St George’s Hospital, London, UK. Email: christine.moffatt@tvu.ac.uk
elastic fibres, are applied as a rigid cuff around the calf, providing a low resting pressure and a higher pressure during walking.

However, a recent paper on compression therapy highlighted the inadequacies of such definitions and the inability to describe combinations of bandages and new developments in bandage technology. For example, four-layer bandaging has been described as a multilayer elastic system, but research shows that while it offers a higher resting pressure than inelastic bandages, its action is similar to inelastic bandages — it, too, produces peaks of pressure when the patient walks.

Box 1 describes the range of compression systems in use, and the indications for applying each one.

Preparing the patient
Edwards et al. demonstrated that patients frequently fail to understand the underlying cause of their ulcer and that, unless this is addressed, healing will be delayed. It is therefore important to ensure they are aware that compression is an important part of treatment. It is also crucial to understand that acceptance of treatment will be influenced by a patients’ previous experiences, as well as their current needs and hopes for the future.

Practitioners considering a compression regimen need to be aware of potential problems — for example, if the patient works, attending for regular treatment may pose a major problem. Symptom control is also a major issue: while, with time, the patient’s pain will decrease, it may increase in the first few weeks after application.

Care of the skin
Before applying compression therapy practitioners should examine the patient’s skin for signs of varicose eczema, extensive build-up of dead cells or loss of skin integrity arising from pressure damage, particularly around the tibial crest, dorsum of the foot and Achilles tendon.

Oedema
Bandage slippage will create bands of oedema above the bandage and indentation beneath the area of slippage. Uneven application will cause bands of oedema where compression is inadequate, most notably at the dorsum of the foot due to overtight bandaging around the ankle, and at mid-calf due to overtightening (extending) of elastic bandages. Poor bandaging technique can cause extreme pain and will have a major impact on concordance.

Odour
Patients may find the odour associated with ulceration repugnant and may socially isolate themselves. They may also discontinue treatment. Regularly washing the limb in warm water with an emollient will help remove excess exudate and reduce odour.

Applying compression to the foot
The foot is particularly vulnerable to pressure damage because, unlike the rest of the leg, it does not have layers of subcutaneous and fatty tissue as protection. However, there is no reason why compression cannot be safely applied over suitable padding. Indeed, there is agreement that all compression bandages should be applied from the base of the toes over a suitable underlayer.

The forefoot is particularly vulnerable to oedema, which will be exacerbated by any tight bandaging around the ankle. Toe bandaging may be required if the toes appear oedematous or sausage-like with enhanced skin folds. Toe lymphoedema may develop without other obvious signs in the limb, particularly in patients with a long history of bandaging for ulceration. It may be a consequence of trapped oedema in the foot, leading to localised secondary skin and lymphatic changes. Mycosis (a fungal infection) is a common accompaniment and may lead to repeated episodes of bacterial infection.
Protection of the foot

- **Dorsum** Application of exceedingly high pressure over the dorsum of the foot can lead to ulceration. Applying extra layers of padding can offer protection. Synthetic padding maintains its cushioning effect better than cotton padding even when wet, although it can cause an allergic reaction. Superior underpadding is now being developed for use beneath compression bandages.14

- **Forefoot** Forefoot oedema can be reduced by a change in bandage application technique and by the use of tailor-made foam pads. Minimal oedema may be removed by the simple addition of an extra layer of bandage to increase sub-bandage pressure over the affected area. Overextension of the bandage should be avoided as it is passed around the ankle because this may prevent drainage of oedema.

- **Retromalleolar area** Ulceration affecting the retromalleolar area can be hard to heal,13 as pressure cannot be applied directly to the ulcer. Wool padding will help to redistribute the pressure more evenly around the ankle. Kidney-shaped foam pads can be applied over the protective padding to increase pressure. If these are not available, a secondary dressing pad can be folded in half and cut to size. Care should be taken to ensure the pads are correctly positioned as slippage may cause pressure damage. After applying the bandage, it is vital to check the patient has good ankle movement.

- **Foot deformities** Foot deformities, such as hallux valgus, are frequently found in patients with leg ulcers and require extra protection. Equinus deformity causes a significant reduction in venous return and is associated with delayed ulcer healing.14 Patient with significant gait deformity should be referred for an orthotics assessment and a custom-made pair of shoes should be provided.

Areas at risk of pressure damage can be protected by individually cut pieces of foam to help disperse the pressure. In addition, patients should be encouraged to wear a shoe that provides adequate support, but is large enough to accommodate the bandage without disruption. Trainers are a suitable choice but may be unpopular with older patients.

Bandaging the ankle

Most patients with venous ulceration require bandaging to the knee only. However, patients with lymphoedema extending to the thigh will require full-length bandaging. A long-established principle in graduated compression is to achieve a pressure gradient of 50–60% between the ankle and knee. Research, however, shows that even experienced bandagers rarely achieve this gradient,15 especially in patients with inverted bottle-shaped legs and those with thin limbs and a loss of gradient.

European recommendations on compression state that bandaging should be applied with the muscle engaged as this increases limb circumference slightly, while in the UK and USA the recommendation is to bandage the limb at rest.16 In any event, the bandage should always extend over the gastrocnemius muscle to avoid slippage. There should also be room to insert a finger in the bandage in the popliteal space to ensure full knee movement.

The tibial crest can be protected by using extra wool padding pleated over the area, or padding placed either side to distribute the pressure away from the bony prominence. Thin limbs may benefit from additional padding in the calf region. The two main techniques for bandaging the limb are:

- The simple spiral: this is generally applied with a 50% extension when using elastic bandages and a 50% overlap to ensure evenness of the two layers of bandage when applied all the way up the limb
- The figure of eight: this is useful for disproportional limbs and is applied with the same overlap and extension as above. Due to the increased number of layers, this technique gives a higher pressure than bandage applied in a spiral technique.16

It is essential to read the manufacturer’s instructions before application. Bandage symbols provide the practitioner with a guide as to how much the bandage can be stretched — for example, rectangles slippage, which can result in extensive pressure damage and lead to the loss of tendon. Care should be taken to avoid overextension of the bandage as it is passed around the ankle. The dorsal tendon area is also vulnerable to high pressure and necrosis. Extra protection may be given using wool padding or foam that has a central slit to allow movement. A thin hydrocolloid dressing may be useful if the skin in this area is particularly vulnerable.

Points for reflection

- How comprehensive are your patient assessments?
- What aspects do you take into account?
- Do you ensure assessment is ongoing?
- Do you alert patients to potential problems?
Points of reflection

How do you ensure that the selection and application of compression therapy reflects patients’ needs?

Do you involve the patient in this process?

become squares and ovals become circles. However, the practitioner must have appropriate training in applying compression.17

Bandages that contain sophisticated elastomers prevent pressure peaks occurring with overextension: the pressure will plateau at around 50% extension and will not increase with further extension.14 Inelastic bandages are applied at their full extension (although the extension range is limited). Multilayer systems such as four-layer bandaging combine spiral and figure-of-eight techniques to produce cumulative compression levels. The complexities of different products and application techniques highlight the need to reclassify bandages in a manner that is comprehensible to all practitioners.

Troubleshooting

Bandage slippage may lead to tissue damage and an extension of the ulcerated area. It will also result in the need to reapply the bandage. Slippage can be reduced by:

- Using extra padding to recontour the limb to a normal shape
- Using the figure-of-eight technique, to help anchor the bandage around the calf
- Applying a cotton liner over the finished bandage.

The greatest slippage is likely to occur with cotton or inelastic bandages, which cannot ‘follow through’ when the oedema is removed and the limb reduced in size. This refers to the ability of the bandage to change as the shape of the leg changes. The recoil effect in elastic bandages means that they are better able to cope with changes in limb size, although some slippage may still occur in very obese patients or, more generally, in the early stages of treatment.

In patients with inverted champagne limb shape, greater pressure may be required in the calf area. Increased pressure can be achieved by increasing the bandage extension, the degree of overlap and the number of layers. Bandages should be replaced if severe slippage occurs to ensure they continue to have a therapeutic effect.

Evaluating effectiveness

It is important to continuously evaluate the patient’s progress and to adapt the compression when necessary. Care must be taken to ensure the correct bandage or system is used throughout treatment. Removal of oedema from the limb will often result in an indented effect, but there should be no signs of pressure damage. The skin and ulcer should be evaluated for signs of maceration, the presence of which would suggest that there is inadequate exudate management. It is also crucial to determine how comfortable the patient has found the bandage and to modify any areas that have caused discomfort.

Conclusion

Concordance with compression therapy remains poorly understood. There is currently no conclusive evidence as to which methods are most effective in improving concordance, but likely approaches include educational, behavioural and affective components.19 Careful assessment and choice of compression therapy is often all that is required. Good pain and symptom control are vital. A patient who feels generally better is more likely to persevere with treatment.

Research shows that when healing fails to occur the patient may feel helpless and lose belief in the treatment,20 so practitioners must be sensitive to patients’ needs. They must also be aware of the deleterious effects of labelling patients ‘non-compliant’ and blaming them for failures in healing. While some patients interfere with their compression deliberately to prevent healing, such cases are few, and such behaviour is generally indicative of underlying issues such as loneliness.21

The greatest improvements in health-related quality of life occur in patients who heal, but it is crucial for professionals to recognise that quality of life can also be improved in those who fail to heal.2 For a small group of patients, healing cannot be achieved and, in such cases, treatment priorities may change. At the centre of the concordance debate is the ability to develop a therapeutic, non-judgmental relationship with patients living with leg ulceration.

Box 2. Summary of the main findings

A comprehensive ongoing holistic assessment of the patient’s condition and general health is a priority if the clinician is to ensure concordance with therapy. It is also vital to consider a patient’s preferences and lifestyle in order to select appropriate therapy options.

The clinician must elicit information about the patient’s previous experiences of treatment as this may have a major impact on whether a patient is willing to have compression therapy and to self-care.

Correct application of compression therapy is crucial if the patient is to adhere to treatment. Incorrect application can cause pain and prevent healing, leaving the patient feeling discouraged.