Best Practice Statement

Compression Hosiery

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Foreword

Best Practice Statement - Compression Hosiery

In recent times clinical guidelines have played a key role in improving clinical outcomes for patients in the United Kingdom. However within the field of Tissue Viability there remains a dearth of well constructed randomised controlled trials to guide the development of evidence based clinical guidelines. Best Practice Statements are one method of overcoming the lack of clinical evidence and ensuring practitioners receive guidance as to the best clinical practice. The key principles of Best Practice Statements are listed below and demonstrate that this approach to practice development is a pragmatic solution to the challenge of ensuring the highest standards of care are consistently delivered.

Key Principles Of Best Practice Statements [NMPDU 2002]

- Best Practice Statements are intended to guide practice and promote a consistent and cohesive approach to care
- Best Practice Statements are primarily intended for use by registered Nurses, Midwives and the staff who support them, but they may contribute to multidisciplinary working and other members of the health care team may find them helpful
- Statements are derived from the best available evidence at the time they are produced, recognising that levels and types of evidence vary
- Information is gathered from a broad range of sources in order to identify existing or previous initiatives at local and national level, incorporate work of a qualitative and quantitative nature, and establish consensus
- Statements are targeted at practitioners, using language that is accessible and meaningful
- Consultation with relevant organisations and individuals is undertaken
- Statements should be reviewed and updated every 3 years
- Responsibility for implementation of statements will rest at local level
- Key sources of evidence and available resources are provided

The Best Practice Statement for Compression Hosiery has been developed by a team of Specialists Co-Chaired by Alison Coull and Mike Clark. During the peer review process practitioners from across the UK have been able to comment on the various drafts. Wounds UK, The Leg Ulcer Forum and Scholl have worked in collaboration with the Specialist Development Team and the many UK reviewers to ensure that this statement will aid practitioners in the delivery of best practice. On behalf of Wounds UK, I would like to thank all of those involved in the development of this statement.

David Gray
Clinical Director
Wounds UK

Reference

NMPDU [2002] Best Practice Statement : Pressure Ulcer Prevention. Nursing & Midwifery Practice Development Unit Edinburgh
http://www.nhshealthquality.org/nhsqis/files/BPSPressureUlcerPrevention.pdf

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Introduction

Compression hosiery (including socks, stockings and tights) are worn for a number of reasons including the:

- prevention of venous leg ulcer recurrence following the initial healing of the wound [1]
- healing of venous leg ulcers [2]
- primary prevention of leg ulcers where varicose veins are present
- prevention of deep vein thrombosis (DVT) [3]
- prevention of complications following DVT, [4] and
- maintenance of reduction of lymphoedema in the lower leg [5].

Compression hosiery is useful for treating clinical conditions related to venous insufficiency and lymphoedema. It has a therapeutic effect on prolonged venous hypertension by supporting the superficial veins and counteracting raised capillary pressure. Compression hosiery reduces oedema by maintaining skin integrity and preventing further deterioration in the leg. Wearing compression hosiery impacts upon venous dynamics [6] - one consequence is a reduced capillary filtration rate which will help reduce oedema [7]. Higher levels of compression (20-30mmHg) having a greater effect upon oedema reduction than lower compression (12mmHg) [8].

While compression hosiery is available in a variety of formats there does not appear to be any significant difference between below- and above- knee hosiery for venous insufficiency [9]. Above knee hosiery is of value only where there is evident disease such as varicosities or insufficiency above the knee.

One of the most significant roles for compression hosiery lies in the primary prevention of long term venous complications such as skin changes and leg ulceration either following DVT [4], or in patients with varicose veins, and the prevention of recurrent venous leg ulceration following healing [10,11,12]. This requires adequate knowledge on the part of the practitioner to correctly identify appropriate hosiery and to work in partnership with patients to promote concordance with recommendations by explaining why compression hosiery needs to be worn, and encouraging them to take ownership of their treatment.

This Best Practice Statement explores issues related to the selection, application and evaluation of compression hosiery to guide health care professionals towards the most appropriate use of compression hosiery products when used to prevent venous leg ulcers. It is not within the scope of the document to examine the use of compression hosiery in treatment of ulceration, varicose veins in pregnancy, or in the prevention or management of deep vein thrombosis. Prior to presenting these Best Practice Statements the introduction sets out some of the key issues that arise within the technical assessment and classification of compression hosiery.

The technical assessment of compression hosiery is typically based upon the amount of compression (measured in mmHg) applied to the lower leg although recently concepts such as static and dynamic stiffness have been introduced to enhance the crude classifications afforded by pressure measurements alone. While stiffness may be a new concept to many it was initially described within the 1985 British Standard on compression hosiery but was overlooked when subsequently evaluating products [13].

Sub-hosiery pressures will be largely determined by three factors - the material from which the hosiery is made, the size and shape of the leg and the activity of the person wearing the hosiery (standing/sitting/walking). There are a number of technical standards through which compression hosiery can be characterised by the compression they apply; for example:

- British Standard BS:6612; 1985
- German Standard RAL-GZ 387; 1987
- Draft European Standard ENV 12718; 2001
- US Standard

Each of these standards sets out different test methods used to provide repeatable measures of the compression applied by compression hosiery. All of these test methods focus upon in-vitro pressure measurements made between the hosiery and a model leg. While in-vitro pressure measurements are important when helping manufacturers to design, build and then classify their products, there is little information about how well the in-vitro pressure measurements match the compression applied to human legs. Pressure measurements achieved by any of the national or draft European standards compression hosiery is then classified - typically into three groups providing mild, moderate or strong compression. A further class providing strong compression is also available for the management of lymphoedema. However the thresholds marking the boundaries between mild, moderate or strong compression differ according to which standard is used to classify the hosiery! For example Class II compression hosiery are stated to apply between 18-24mmHg at the ankle (BS 6612; 1985) but if classified under the draft European standard would have to apply 23-32mmHg to be a Class II product. Therefore, for the practitioner knowledge of both the class of compression and the standard under which that classification was made are required if they are to effectively select and use any compression hosiery product. Currently only British standard compression hosiery is available in the community on prescription in the UK. In the acute sector, European standard hosiery may be prescribed.

Measurement of the stiffness of compression hosiery products.

Stiffness of a compression hosiery product was defined in BS 6612 of 1985 as being a measure of the change in applied compression which occurs when the ankle (or calf, thigh or hip) girth is increased or decreased. This measure can be called the static stiffness with dynamic stiffness marking the changes in the compression applied as the leg changes its circumference during walking 14. These concepts of static or dynamic stiffness have not yet been included within classifications of compression hosiery but have a potentially important role. For example two Class II compression hosiery products may apply apparently similar pressures to the leg at rest but if one product is 'stiffer' than the other then the pressures applied during walking will be much higher in the case of the 'stiff' hosiery product 15. It is possible that for compression hosiery products to be fully characterized into a meaningful classification for practitioners and manufacturers then the classification must be based on both the level of compression applied and the 'stiffness' of the product.

Structure of the Best Practice Statement

This document sets out a number of key statements related to health care professional knowledge of compression hosiery and its classification, the assessment process including product selection, the fitting, first application and general application of hosiery, hosiery care including wear time, educational needs and review of the care delivered. Each statement is associated with a reason why it is considered relevant along with audit mechanisms to measure successful implementation of the Best Practice Statements. The document has been developed by a group of experts and circulated widely for critical review.

1. Health Professional Knowledge

Statement	Reason for statement	How to demonstrate statement is being achieved
• Before undertaking an assessment, all practitioners should have knowledge and awareness of different types of compression hosiery and aids to help application. • The compression hosiery selected should be appropriate to the presenting needs of the patient. • All practitioners should have knowledge of and awareness of different types of fittings (styles and materials) and aids before they undertake an assessment. • Practitioners have the ability, knowledge and understanding to explain the principles of compression hosiery to the patient. • The fittings and aids should be appropriate to the patient's level of need.	• Different patients have different requirements of compression hosiery. [2,16] • Different compression hosiery products provide different levels of compression (figure 1 [17]). • Different compression hosiery products provide different benefits. [2] • Different patients have different needs for fittings and aids. [9,11,18,19,20,21] • Patients' requirements will be based on assessment outcome. • Aids may increase the number of patients able to apply their own hosiery [11,19]	• Practitioners have undertaken demonstrable training in the measurement, selection, application and fitting of compression hosiery. • Practitioners have access to appropriate information, available in a variety of formats at their work-base.

2. Health Professional Knowledge - classification

Statement	Reason for statement	How to demonstrate statement is being achieved
• Before assessment all practitioners should have knowledge and awareness of the purpose for the different levels of compression (figure 1 [17]) and the anticipated risks and therapeutic benefit. • Monitor the patient according to local / national guidance.	• To maximise anticipated benefits and minimise risk of harm. • In general, except in the presence of ischaemia, or similar conditions, [11] more severe venous disease or insufficiency requires greater compression therapy. The worse the condition, the greater the required compression. [23] • To identify patients with oedema who may require compression bandage therapy prior to using compression hosiery. • Currently there are no international standards for compression classes. Therefore the practitioner should have an understanding of the UK and European classes and be aware that there are also, German RAL and USA compression levels for different products (Figure 1 [17]).	• Practitioners have undertaken demonstrable training in the measurement, selection, application and fitting of compression hosiery • Practitioners have access to appropriate information which may be available in a variety of formats in or from their work-base.

3. Assessment - Process of selection

Statement	Reason for statement	How to demonstrate statement is being achieved
• All individuals who may require compression hosiery must be appropriately assessed. • Assessment is about identification of variables that influence selection of compression hosiery. This in part relates to discussion with patient, examination of past medical history, hosiery history, diagnostic test results including vascular / Doppler assessment, skin condition and allergies. (Figure 2 [24]) Mobile patients without ulcers in compression and NO complications and who are able to report problems should have a vascular assessment, that includes Doppler, performed yearly [25]. Diabetic patients (but ABPI may be problematic in terms of accuracy), patients who have reduced mobility or who are immobile, patients with a previous ABPI of less than 0.9 or who develop symptoms of claudication should have at least 3 monthly Doppler. Patients with a reducing ABPI should have more regular checks. • Venous disease may be identified and classified according to the CEAP (Clinical-Etiology-Anatomy-Pathophysiology)[26] or Widmer system [27]	• To maximise anticipated benefits and minimise risk of harm. [18,19,20,28] • Potential deterioration can occur in some patients with venous outflow obstruction when given compression. • Patients with reduced ABPI (mixed arterial / venous disease and an ABPI of 0.5-0.8). should have reduced compression up to 20mmHg at the ankle, and patients with severe arterial insufficiency and venous disease (ABPI <0.5) should have no compression. • Immobile patients may not report arterial symptoms. • Compression may be hazardous in patients with arterial disease. • Patients with an ABPI <0.8 should be referred to a vascular surgeon.	• Assessment results are documented in the patient's case notes and include past medical history, hosiery history, diagnostic test results including vascular / Doppler assessment, skin condition and allergies, leg measurement and clinical signs of disease. This may, where relevant, record hosiery history, sensitivity history, and any patient preferences. • The assessment for hosiery recorded in the case record is timed, such that it demonstrates there to be no unnecessary delay in provision for the patient. • Patients with an ABPI <0.8 have been referred to a vascular surgeon.

4. Product selection by size of limb

Statement	Reason for statement	How to demonstrate statement is being achieved
• Product selection requires an accurate measurement of the limb. • Accurate measurement of the leg is essential before product selection, using appropriate tools such as a measurement chart. (Appendix 1) • Measurements for flat knit and custom made hosiery will require specific documentation outlining measurement points e.g. AD = Below knee, AG = Thigh stocking , AT = Tights and AT mat/with fly = Maternity and male tights • The limb should be as free from oedema as possible to ensure an exact fit. • The ideal time to obtain measurements is preferably early morning, or immediately after removing compression bandage therapy or after a period of limb elevation.	• Practitioners must be able to select the most appropriate hosiery product to maximise benefit and safety. [18,19,20,21,22] • To help identify patients who require made to measure hosiery. [17,19] • Hosiery product sizings vary between manufacturers. • Manufacturers have different recommendations for the measurement of legs. • The prerequisite for effective successful management with compression hosiery is an accurate fit. • Oedematous legs may be unsuitable for hosiery if the individual has thin fragile skin, or has not had compression bandaging to reduce the oedema first. • The combination of appropriate compression and optimal anatomical fit will ensure effective therapy is achieved.	• Leg measurements and limb shape are documented in the patient's records. There is also documented evidence that the measurements are matched to the chosen manufacturer's size charts. • Patients wear a well fitting garment and there is an absence of lower limb oedema. • Limb circumference should be documented in the patient notes.

5. Product selection - factors other than leg size

Statement	Reason for statement	How to demonstrate statement is being achieved

• Product selection should not be solely determined by the size and shape of the leg
• Product selection may be influenced by other factors, including patient choice, above or below knee, and type of materials e.g. cotton rich.
• Working in partnership with patients enabling them to have a choice, will ensure concordance to recommended treatments is achieved and maintained.
• Practitioners should have the knowledge and understanding to be able to explain to patients how flat knit, circular knit and custom made are produced and the rationale for recommending the appropriate hosiery.
• Consideration should be given to whether the patient requires hosiery for each leg, and an appropriate prescription issued for the correct number of items required.
	• Individuals may be sensitive to product components such as Lycra®, elastane and other elastic materials. [11,18,19,22,24]
	• To promote a patient-centred approach and maximise therapeutic benefits. [14,15]
	• Appropriate selection will maximise the probability of continued wear and thus concordance with compression therapy. [19,21]
	• Appropriate selection will maximise the probability of long term use by the patient.
	• Patient choice factors include:
	  • colour
	  • variety
	  • style (knee/ thigh length)
	  • open/closed toe
	  • 'feel'
	  • washing and after care
	  • prior experience of hosiery
	  • the ability to be in control by being able to apply and remove (Appendix 2)
		• Documented evidence of patient involvement and identification of influencing factors.

6. Other factors influencing product selection

Statement	Reason for statement	How to demonstrate statement is being achieved

• Skin condition should be considered when selecting products.
• The compression class indicates the pressure that the stocking exerts on the surface of the skin it surrounds. Therefore practitioners should have knowledge and an understanding of common skin conditions and those associated with chronic venous disease.
	• To minimise the risk of recurrence and other adverse events due to:
	  ◦ Skin conditions such as dermatological sensitivities to materials
	  ◦ Use of ointments and creams
	  ◦ Fragility of skin due to use of steroids
	  ◦ Fragility of skin due to recent healing
	  ◦ Need to take hosiery off to apply creams/treatments
	• Higher levels of compression may not be tolerated in patients with especially fragile skin due to difficulties with application. Other factors include: sensitivity to materials (Lycra®, elastic materials), skin conditions, e.g. fragility in rheumatoid arthritis, steroid therapy, and over newly healed ulcers, and the need for concurrent use of dermatological ointments and creams which can affect hosiery viability.
	• To maximise anticipated benefits.
	• Minimise risk of further skin breakdown.[1,11,18,19,20]
		• Allergies have been documented. Allergens are avoided when a product is chosen, and are not a component of the selected product.
		• Treatment regime is in accordance with assessment. (The patient is using hosiery appropriate to them.)
		• There is no conflict between documented treatment regimes and skin condition.
		• Where compression bandages have been used to healing of the ulcer this management should continue for at least 2-4 weeks prior to application of hosiery to allow skin to strengthen.
		• Patients with skin conditions report no adverse reactions to hosiery.

7. Fitting

Statement	Reason for statement	How to demonstrate statement is being achieved
• Compression hosiery delivered for fitting on the patient matches the product selected/prescribed/ recommended by the assessing practitioner. • In order for compression therapy to be successful, hosiery should be selected at the appropriate compression level for the condition identified and managed. • A copy of the hosiery prescription should be held by the patient.	• The product selected/prescribed/recommended should be the correct item for the patient, to ensure the successful conclusion of the assessment process. • To maximise anticipated benefits and minimise risk of harm.	• The hosiery worn by the patient matches the selected compression hosiery.

8. First application

Statement	Reason for statement	How to demonstrate statement is being achieved
• The first application of hosiery is undertaken / supervised by a responsible and competent practitioner trained in application of hosiery.	• To prevent avoidable skin damage. [2,16,18,19,29] • To ensure the hosiery application and removal can be achieved safely and comfortably. • To educate the patient and others regarding the correct use and care of the hosiery. [1] • To identify any further application aids that are required and were unforeseen earlier in the assessment process. (Appendix 3)	• The first application of hosiery is undertaken with a responsible and competent practitioner. • Practitioners have undertaken demonstrable training in the measurement, selection, application and fitting of compression hosiery. • The first demonstration and outcome of application is documented and any necessary appropriate action taken. • Any necessary application aids have been provided and are being used (Appendix 3). • Patient has the dexterity and cognitive ability to apply recommended hosiery ensuring concordance is achieved.

9. Application

Statement	Reason for statement	How to demonstrate statement is being achieved
• Patient and / or carer are taught how to use fitting application aid safely and correctly (Appendix 3). • During first application, difficulties are identified and addressed. • The hosiery can be safely and comfortably applied to the leg. • Newly fitted hosiery should be checked one week after fitting.	• To identify if any suitable aids for application are required (Appendix 3). • To facilitate continued wear and to prevent avoidable skin damage. [11,18,19] • Carer input may be required as a proportion of patients are unable to apply hosiery with accessories supplied for the purpose.	• The first application of hosiery is undertaken with a responsible and competent practitioner. • Practitioners have undertaken demonstrable training in the measurement, selection, application and fitting of compression hosiery. • Any necessary application aids have been provided and are being used (Appendix 3). • The individual is wearing compression hosiery.

10. Wear time

Statement	Reason for statement	How to demonstrate statement is being achieved
• Wear times for compression hosiery need to be assessed/ negotiated on an individual basis. • Compression hosiery with any defect or damage should be replaced. • Patients should be encouraged to report damaged or defective hosiery. • Information should be given to patients on how to renew/ replace hosiery. • Generally, patients should be advised that compression hosiery needs to be worn for life. [12]	• Generally, patients wearing compression hosiery need to be advised to remove it at night and reapply first thing in the morning prior to any swelling occurring. Where this is not possible it may be acceptable to extend hosiery wear-time up to a maximum of seven days. • If a combination of hosiery classes is used then a minimum of one layer should be removed at night. • Extended wear-times may lead to poor skin condition. • To facilitate skin observation, hygiene and maintenance of optimal skin condition (including the use of emollients). [18,19] • The effectiveness of a damaged or defective garment is no longer guaranteed. Oedema can occur as a result of wearing damaged garments. • Patients will remain stable or improve when hosiery is worn. [12]	• A negotiated agreement for wear time is documented. • The garment's elasticity and compression effectiveness can be easily and regularly checked by stretching the stocking On stretching, the garment should return to its original shape, and there should be no defect or damage evident. • Patients are not wearing damaged or defective garments.

11. Care of the hosiery

Statement	Reason for statement	How to demonstrate statement is being achieved
• Compression hosiery should be cared for and renewed following manufacturers instructions. • Practices which may damage hosiery are avoided.	• To obtain the anticipated lifespan of compression hosiery. • To prevent damage from hazards such as oil based emollients, nails, jewellery, sharp edges, pets, chemicals, excessive heat on washing/drying etc. [18]	• Compression hosiery has not been replaced more frequently than stated in the manufacturer's instructions.

12. Patient and/or carer education

Statement	Reason for statement	How to demonstrate statement is being achieved
• All patients and / or carers will be provided with appropriate information in accessible formats to cover all aspects of the use and care of the compression hosiery. • Ensure patient and / or carers fully understand the importance of compression hosiery and the benefits of caring for the garment according to the manufacturer's recommendations.	• Maximise benefit and minimise risk of hosiery use.	• At approximately four weeks after hosiery fitting / application, the patient is asked if they are satisfied with the information provided to them. The outcome and any necessary action required is documented.

13. Review of appropriateness of compression hosiery

Statement	Reason for statement	How to demonstrate statement is being achieved
• Patient should be reviewed and re-measured on a regular basis, approximately 3 - 6 monthly (Figure 2). • Appropriate referrals are made for individuals in need of specialist support. • Patient should be remeasured if there is any significant change in limb size.	• To determine the continued appropriateness of the compression strategy. [1,19,20] • To encourage continued use. • To identify any problems promptly. • The full assessment cycle should commence again on recurrence of ulceration. • To ensure patients with specialist needs are referred for specific advice. • To ensure referrals are carried out at the appropriate time and in a consistent manner.	• Referral procedures are explicit in written guidance documents. • There is a documented and dated review identifying outcome in the patient's record.

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Figure 1: Compression levels for different products

	Provision	Examples	Class 1	Class 2	Class 3
UK Class or British Standard	FP10 / GP10	Activa Credalast Duomed Scholl	14-17mmHg	18-24mmHg	25-35mmHg
UK Class or British Standard	FP10 / GP10	Activa Liner Stocking Jobst Liner Stocking Activa Leg Ulcer Hosiery Kit 2-layer (class 3 only) Surepress Comfort 2-layer (class 3 only)	10mmHg 10mmHg		40mmHg
European Class *Approximate pressure. Manufacturers vary. Venosan produce products in excess of 50mmHg	Not on FP10 / GP10 but may be purchased	Credenhill Juzo Medi range Sigvaris Venosan*	20-30mmHg*	30-40mmHg*	40-50mmHg*
	FP10 / GP10	Jobst Ulcer Care 2-layer system			40mmHg

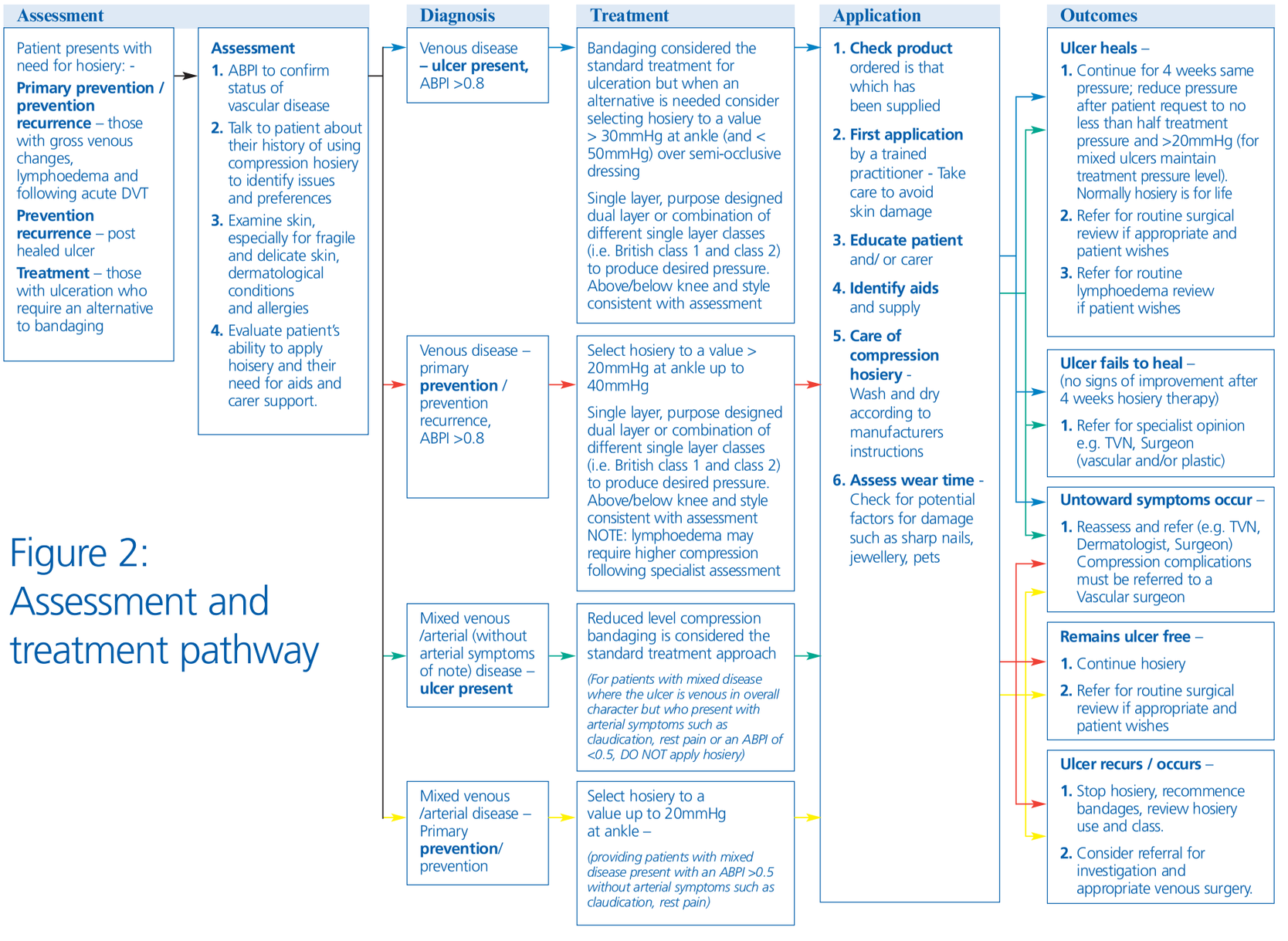
RAL Compression classes

1 18-21mmHg
2 23-32mmHg
3 34-46mmHg
4 >49mmHg

US Compression classes

1 8-15mmHg support
2 15-20mmHg
3 20-30mmHg
4 40mmHg

Figure 2: Assessment and treatment pathway



Appendix 1

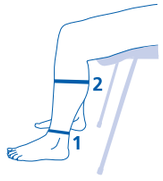
Required measurements will vary depending on manufacturers - this is a guide only.

For all stockings and socks

Measure with patient seated, feet flat on floor.

Step 1 - measure the ankle
Measure around the narrowest point, just above the anklebone.

Step 2 - measure the calf
Measure around the widest part of the calf.



For thigh length stockings

Also measure the thigh:

Measure with patient standing.

Measure around either:
- the widest part of the thigh; or
- 2" above the uppermost visible vein.

For closed toe stockings and socks

Also measure the length of the foot:

Measure the foot from the heel to the tip of the longest toe.

Appendix 2

Product selection

Open toed can be preferred in the following circumstances:
- Arthritic or clawed toes
- When foot size does not correspond with girth measurements of leg
- When the client prefers to wear a sock over the top
- When the client is wearing 2 layers of hosiery, one layer should be open toed to avoid restriction of toes
- To enable the use of specific hosiery aids
- If a client has problem with fungal infections

Made to measure hosiery will be required when:
- The client has an unusual shaped limb, or any of the measurements are proportionally large or small
- The measurement around the malleoli is particularly wide
- Flat-bed knit is required for lymphoedema

Appendix 3: Hosiery application aids

Name	Manufacturer	Address	Tel/Fax	E-mail/Website
ACTIVA Acti-glide	Activa Healthcare Ltd	1 Lancaster Park Newborough Road Needwood Burton -upon -Trent Staffordshire DE13 9PD	Customer Care Line: 08450 606707	Website: www.activahealthcare.co.uk
CREDENHILL Easy-Slide (open toe) Caran (closed toe) Easy-Lever (aid removal)	Credenhill Ltd	10, Cossall Industrial Estate Ilkeston Derbyshire DE7 5UG	Tel: 0115 932 0144 Fax: 0115 944 0437	
JUZO Slippies Specify for open or closed toe	Juzo UK Ltd	Unit 1, Edison Place Dryburgh Industrial Estate Dundee DD2 3QU	Tel: 01382 826620 Fax: 01382 826641	
MEDI Valet (& Slip aids)	Medi UK Ltd	Plough Lane Hereford HR4 0EL	Tel: 01432 353500 Fax: 01432 373510	
PAREMA Sock Aid frame	Parema	Sullington Road Shepshed Leicestershire LE12 9JJ	Tel: 01509 502051 Fax: 01509 504019	
SSL (Scholl) Slip-aids	SSL International	Venus No.1 Old Park Lane Manchester M41 7HA	Customer Relations Department: 0800 074 2040	Website: www.scholl4legs.co.uk

Notes