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Nursing Best Practice Guideline

Shaping the future of Nursing

Assessment and Management of Venous Leg Ulcers

Guideline supplement

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Supplement Integration

This supplement to the nursing best practice guideline *Assessment and Management of Venous Leg Ulcers* is the result of a three year scheduled revision of the guideline. Additional material has been provided in an attempt to provide the reader with current evidence to support practice. Similar to the original guideline publication, this document needs to be reviewed and applied, based on the specific needs of the organization or practice setting/environment, as well as the needs and wishes of the client. This supplement should be used in conjunction with the guideline as a tool to assist in decision making for individualized

client care, as well as ensuring that appropriate structures and supports are in place to provide the best possible care.

Since the original publication of this guideline, venous leg ulcers have continued to be a significant and chronic problem for large numbers of Canadians, with major implications to quality of life and overall healthcare costs (Harrison et al., 2005). A review of the most recent literature and relevant guidelines published since 2004 does not suggest dramatic changes to our assessment and management approach to venous leg ulcers, but rather suggest some refinements and stronger evidence for our approach.



Revision Process

The Registered Nurses' Association of Ontario (RNAO) has made a commitment to ensure that this practice guideline is based on the best available evidence. In order to meet this commitment, a monitoring and revision process has been established for each guideline every 3 years. The revision panel members (experts from a variety of practice settings) are given a mandate to review the guideline focusing on the recommendations and the original scope of the guideline.

Members of the panel critically appraised three international guidelines, published since 2004, using the *Appraisal of Guidelines For Research and Evaluation* (AGREE Collaboration, 2001) instrument. This review resulted in the following guideline and accompanying document being used as a supportive resource during the revision process of this RNAO guideline:

Royal College of Nursing (RCN). (2006). *Clinical practice guideline: The nursing management of patients with venous leg ulcers*. [Online].

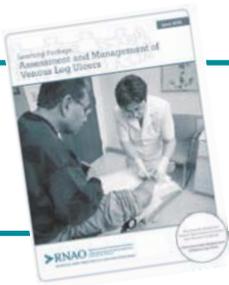
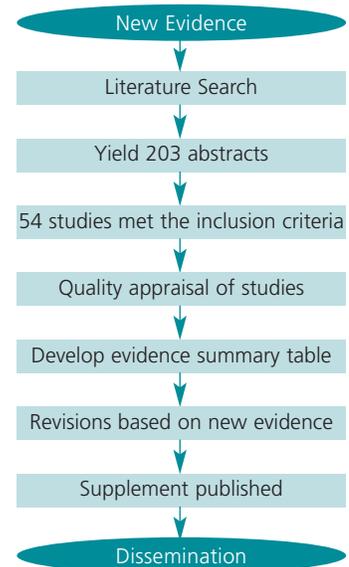
Available: http://www.rcn.org.uk/publications/pdf/guidelines/venous_leg_ulcers.pdf.

Accompanying document:

Prodigy. (2004). Leg ulcer – venous.

[Online]. Available: http://www.cks.library.nhs.uk/leg_ulcer_venous

Review/Revision Process Flow Chart



Look for the following resources to support the implementation of this guideline (available for free download at www.rnao.org/bestpractices):

- *Learning Package: Assessment and Management of Venous Leg Ulcers*
- *Health Education Fact Sheet: Taking Care of Your Legs*

Summary of Evidence

The following content reflects the evidence reviewed that either supports the original guideline recommendations or provides evidence for revision. Through the review process, many recommendations were re-worded, removed or combined to reflect current knowledge and to enhance the clarity of the document. Two new recommendations have also been added. As a result of these changes, the numbering of the recommendations has been revised. The following are the recommendations supported by the revision process. Details regarding the omitted recommendations can be found on page 14.

-  unchanged
-  changed
-  additional information
-  new recommendation

Practice Recommendations: Comprehensive Assessment	
<p>The section heading was modified to emphasize that a <i>comprehensive</i> assessment, where a complete client assessment precedes evaluation of limb and ulcer characteristics, is essential to determine the underlying ulcer etiology and appropriate treatment approaches</p>	+
<p>Recommendation 1</p> <p><i>Assessment and clinical investigations should be undertaken by healthcare professional(s) trained and experienced in leg ulcer management.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	✓
<p>Additional Literature Supports</p> <p>RCN, 2006</p>	
<p>Recommendation 2</p> <p><i>A comprehensive clinical history and physical examination includes:</i></p> <ul style="list-style-type: none"> ■ <i>blood pressure measurement;</i> ■ <i>weight;</i> ■ <i>blood glucose level;</i> ■ <i>doppler measurement of Ankle Brachial Pressure Index (ABPI);</i> ■ <i>any other tests relevant to presenting patient's condition;</i> ■ <i>ulcer history;</i> ■ <i>ulcer treatment history;</i> ■ <i>medical history;</i> ■ <i>medication;</i> ■ <i>bilateral limb assessment;</i> ■ <i>pain;</i> ■ <i>nutrition;</i> ■ <i>allergies;</i> ■ <i>psychosocial status (including quality of life); and</i> ■ <i>functional, cognitive, emotional status and ability for self-care.</i> <p><i>The above should be documented in a structured format for a client presenting with either their first or recurrent leg ulcer and should be ongoing thereafter.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	
<p>This recommendation has been modified to incorporate original Recommendations 2, 3, 4, 6, 7, 13 and 26, in order to emphasize the essential components of a comprehensive clinical assessment. <i>Any other tests relevant to presenting patient's condition, ulcer treatment history, medical history and medications</i> have also been added to reflect components of an assessment that may provide valuable information towards the development of an appropriate treatment plan.</p> <p>A comprehensive clinical history and physical examination will provide important information regarding the underlying etiology of the ulcer. There are several types of leg ulcers whose treatment is beyond the scope of the guideline. The recommendations presented here were developed specifically for the management of leg ulcers related to venous disease. Appendix M (page 16 of this supplement) provides a description of physical findings that would indicate venous disease versus arterial disease.</p>	+

<p>Recommendation 3</p> <p><i>A comprehensive assessment of an ulcer should include:</i></p> <ul style="list-style-type: none"> ■ measurement of the wound and undermining; ■ amount and quality of exudate; ■ wound bed appearance; ■ condition of the wound edge; ■ infection; ■ presence or absence of patient suffering; and ■ re-evaluation. <p style="text-align: right;"><i>(Level C)</i></p> <p><i>Measure the surface areas of ulcers, at regular intervals, to monitor progress. Maximum length and width, or tracings onto a transparency are useful methods.</i></p> <p style="text-align: right;"><i>(Level B)</i></p>	
<p>Key elements of ulcer assessment have been added to this recommendation to reflect that ulcer condition is best evaluated using a comprehensive approach. The panel cautions, however, that the presence of undermining is rare with venous ulceration and therefore warrants further assessment to rule out other etiologies (i.e. arterial disease).</p> <p>Additional Literature Supports Sibbald et al., 2006</p>	<p>+</p>
<p>Recommendation 4</p> <p><i>Regular ulcer assessment is essential to monitor treatment effectiveness and healing goals.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	<p>✓</p>
<p>Practice Recommendations: Diagnostic Evaluation</p>	
<p>Recommendation 5</p> <p><i>An Ankle Brachial Pressure Index (ABPI) measurement should be performed by a trained practitioner to rule out the presence of peripheral arterial disease, particularly prior to the application of compression therapy.</i></p> <p style="text-align: right;"><i>(Level B)</i></p>	
<p>This recommendation has been modified to emphasize the role of Ankle Brachial Pressure Index (ABPI) measurement within the scope of nursing practice and represents a combination of original Recommendations 9 and 10. In the management of venous leg ulcers, ABPI measurement offers valuable information as a screening tool for lower extremity peripheral arterial disease (Hirsch et al., 2006). Where peripheral arterial disease is suspected, compression therapy treatments designed for venous leg ulcers may be contraindicated. ABPI may also offer prognostic data that are useful to predict limb survival, wound healing and patient survival. The use of ABPI measurement for diagnosis is generally outside of the scope of nursing practice. Furthermore, only those practitioners with the appropriate knowledge, skill and judgement to perform this measurement should do so.</p> <p>Additional Literature Supports Hirsch et al., 2006; RCN, 2006; Smith et al., 2003</p>	<p>+</p>
<p>Recommendation 6</p> <p><i>An Ankle Brachial Pressure Index (ABPI) >1.2 and <0.8 warrants referral for further medical assessment.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	

<p>This recommendation has been modified to emphasize the importance of specialized assessment in cases of abnormal ABPI. People with abnormally low or abnormally high ABPI should be further investigated for peripheral arterial disease (Hirsch et al., 2006). For example, an ABPI >1.3 is considered indicative of non-compressible vessels that are found in individuals with diabetes, chronic renal failure and who are older than 70 years of age. In these cases, compression therapy may not be recommended.</p> <p><i>Additional Literature Supports</i> Hirsch et al., 2006; Partsch & Partsch, 2005; Schroder & Diehm, 2006</p>	+
<p>Recommendation 7</p> <p><i>Prior to debridement, vascular assessment, such as Ankle Brachial Pressure Index (ABPI), is recommended for ulcers in lower extremities to rule out vascular compromise and ensure healability.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	
<p>The wording of this recommendation has been modified to indicate that vascular assessment (including ABPI) may also provide information regarding the <i>healability</i> of the wound. Adequate perfusion to these wounds indicates that healing is supported by the microvascular supply and that debridement, when appropriate, may be safely performed.</p>	+
Practice Recommendations: Pain	
<p>Recommendation 8</p> <p><i>Pain may be a feature of both venous and arterial disease, and should be addressed.</i></p> <p style="text-align: right;"><i>(Level B)</i></p>	✓
<p>A comprehensive approach to pain is beyond the scope of this guideline. Refer to the RNAO Best Practice Guideline <i>Assessment and Management of Pain (Revised)</i> (RNAO, 2007) for strategies by which to address pain.</p> <p><i>Additional Literature Supports</i> Charles, 2002; Nemeth et al., 2004</p>	+
<p>Recommendation 9</p> <p><i>Prevent or manage pain associated with debridement. Consult with a physician and pharmacist as needed.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	✓
Practice Recommendations: Venous Ulcer Care	
<p>Recommendation 10</p> <p><i>Develop treatment goals mutually agreed upon by the patient and healthcare professionals, based on clinical findings, current evidence, expert opinion and patient preference.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	NEW
<p>Prior to commencing wound care, a treatment plan must be developed based on the goals of care for the particular client. The healing potential of the wound is one factor that may impact on the goals of care. Potential for healing is affected by local, host, and environmental factors. For any issues identified in the assessment that may impair healing, a plan needs to be developed that addresses these as well. Appendix N (page 16 of this supplement) provides a list of factors that may impact healing potential.</p>	+
<p>Recommendation 11</p> <p><i>Local wound bed preparation includes debridement when appropriate, moisture balance and bacterial balance.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	NEW

<p>The panel strongly recommends a systematic approach to wound care. The aim of local wound bed preparation is the removal of barriers to healing. Appendix O (page 17 of this supplement) outlines important considerations when preparing the wound bed.</p> <p>Not all wounds require debridement. The need for debridement is based on the goals of the client. Other issues when considering the appropriateness of debridement include the practice setting, skill of the clinician and the ability of the patient to tolerate the procedure. When choosing between particular techniques, considerations should include <i>type, quantity and location of nonviable tissue, the depth of the wound, the amount of wound fluid</i> and the <i>general condition and goals of the client</i>. Appendix P (page 17 of this supplement) compares the methods of debridement based on several key considerations. Refer to the original guideline (RNAO, 2004) for a more detailed discussion of debridement.</p> <p><i>Moisture balance</i> refers to the management of exudate and maintenance of fluids in the wound bed. When healing is the goal, a balanced moist wound environment ensures that there is sufficient moisture to facilitate cellular growth but not in excess to cause further skin breakdown. The primary approach to achieving moisture balance is through the appropriate use of moisture-balancing dressings (Okan et al., 2007).</p> <p><i>Bacterial balance</i> describes the bacterial level present in a wound and their ability to cause damage or infection. All chronic wounds contain bacteria. However, the impact of these bacteria on healing is dependent on several factors, including the number of organisms, the virulence of these organisms and host resistance (Sibbald, Woo, & Ayello, 2006). Promoting host resistance, through optimizing overall health of the client, is an important aspect of achieving bacterial balance. The management of existing infection is addressed in the following section of this supplement.</p> <p>Additional Literature Supports Sibbald et al., 2006; Sibbald, Woo, & Ayello, 2006; Okan et al., 2007</p>	+
<p>Recommendation 12</p> <p><i>Cleansing of the ulcer should be kept simple; warm tap water or saline is usually sufficient.</i></p> <p style="text-align: right;"><i>(Level B)</i></p>	✓
<p>Recommendation 13</p> <p><i>First-line and uncomplicated dressings must be simple, low adherent, acceptable to the client and should be cost-effective.</i></p> <p style="text-align: right;"><i>(Level A)</i></p>	
<p>A recent systematic review by Palfreyman et al. (2007) found insufficient evidence to support the use of a particular <i>first-line and uncomplicated</i> dressing type (beneath compression therapy) for the treatment of venous leg ulcers. As such, the authors suggested that decisions regarding dressings should be based on local costs and practitioner or patient preferences (Palfreyman et al., 2007). Similarly, the RCN guideline (2006) states that for patients not requiring frequent compression bandaging, the cost-effectiveness of the dressing will be related to its ability to remain in place and manage the exudate. The wording of this recommendation was modified to reflect a consideration of cost-effectiveness when choosing a dressing.</p> <p>In a systematic review by O'Donnell and Lau (2006), despite the findings that certain complex wound dressings resulted in better outcomes in both the proportion of ulcers healed and time to healing, the authors maintained that the selection of the specific dressing will depend on the dressing characteristics for ease of application, patient comfort, wound drainage absorption and expense.</p> <p>Additional Literature Supports O'Donnell & Lau, 2006; Palfreyman et al., 2007; RCN, 2006; Schulze et al., 2001; Smith et al., 2004; Vanscheidt, Sibbald, & Eager, 2004; Vin, Teot, & Meaume, 2002</p>	+
<p>Recommendation 14</p> <p><i>Avoid products that are known to cause skin sensitivity, such as those containing lanolin, phenol alcohol, or some topical antibiotic and antibacterial preparations.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	

<p>The wording of this recommendation has been modified to indicate that not all topical antibiotic and antibacterial preparations are known to cause skin sensitivity. The change in the wording is for clarification only, and there has been no change in the intent of the recommendation.</p>	+
<p>Recommendation 15</p> <p><i>Choose a dressing that optimizes the wound environment and patient tolerance.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	
<p>This recommendation was revised to indicate that there are many considerations when choosing an appropriate dressing. Dressings are usually applied beneath the compression to aid healing, comfort and to control exudate. Wounds heal quicker in a moist environment and dressings are used to absorb excess fluid or retain fluid in an otherwise dry wound (Palfreyman et al., 2007).</p> <p>Additional Literature Supports Palfreyman et al., 2007; Schulze et al., 2001</p>	+
<p>Recommendation 16</p> <p><i>No specific dressing has been demonstrated to encourage ulcer healing.</i></p> <p style="text-align: right;"><i>(Level A)</i></p>	✓
<p>Additional Literature Supports Nelson, Cullum, & Jones, 2006; O'Donnell & Lau, 2006; Palfreyman et al., 2007; Vin, Teot, & Meaume, 2002; Wollina et al., 2005</p>	+
<p>Recommendation 17</p> <p><i>In contrast to drying out, moist wound conditions allow optimal cell migration, proliferation, differentiation and neovascularization.</i></p> <p style="text-align: right;"><i>(Level A)</i></p>	✓
<p>Recommendation 18</p> <p><i>Refer clients with suspected sensitivity reactions to a dermatologist for patch testing. Following patch testing, identified allergens must be avoided, and medical advice on treatment should be sought.</i></p> <p style="text-align: right;"><i>(Level B)</i></p>	✓
<p>The panel notes that for most nurses, referral is outside their scope of practice. However, nurses are encouraged to advocate for appropriate referrals as necessary.</p>	+
<p>Recommendation 19</p> <p><i>Venous surgery followed by graduated compression hosiery is an option for consideration in clients with superficial venous insufficiency.</i></p> <p style="text-align: right;"><i>(Level A)</i></p>	
<p>The level of evidence has been updated in the context of recent research that indicates a significant reduction in ulcer recurrence after venous surgery for clients with superficial venous insufficiency.</p> <p>Additional Literature Supports Barnwell et al., 2004; Obermayer et al., 2006; Roka, Binder, & Bohler-Sommeregger, 2006; Ting et al., 2006; van Gent et al., 2006</p>	+

<h2>Practice Recommendations: Infection</h2>		
<p>Recommendation 20</p> <p><i>Assess for signs and symptoms of infection</i></p> <p style="text-align: right;"><i>(Level A)</i></p>		
<p>The wording of this recommendation was modified to appropriately reflect nurses' scope of practice. It is imperative that the assessment and treatment of infection be addressed as it can influence the plan of care, such as the use of local dressings, compression modalities and adjunctive therapies. Refer to Appendix Q (page 18 of this supplement) for a list of signs and symptoms of infection.</p>		+
<p>Recommendation 21</p> <p><i>Manage wound infection with cleansing and debridement, as appropriate. Where there is evidence of cellulitis, treatment of infection involves systemic antibiotics.</i></p> <p style="text-align: right;"><i>(Level B)</i></p>		
<p>This recommendation, which reflects a combination of original Recommendations 29 and 30, was modified based on infectious disease guidelines and current evidence. Cellulitis is characterised by the presence of some of the following signs or symptoms: pyrexia, increasing pain, increasing erythema of surrounding skin; purulent exudate; and rapid increase in ulcer size.</p> <p><i>Additional literature supports</i> Cutting and White, 2005; Gardner, Franz, & Doebbeling, 2001; Grayson et al., 2002; Rosser et al., 2005;</p>		+
<p>Recommendation 22</p> <p><i>The use of topical antiseptics to reduce bacteria in wound tissue should be reserved for situations in which concern for bacterial load is higher than that of healability.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>		
<p>This recommendation has been modified in the context of current evidence that suggests that the use of topical antiseptics may be beneficial for short term use, particularly when bacterial levels are sufficiently high to cause tissue destruction and the goal of care is the maintenance of the wound. Some antiseptics have been shown to be safe and efficacious for this purpose in wound care. Appendix R (page 18 of this supplement) provides a summary of evidence for various antiseptics.</p> <p><i>Additional literature supports</i> Drosou, Falabella & Kirsner, 2003</p>		+
<h2>Practice Recommendations: Compression</h2>		
<p>Recommendation 23</p> <p><i>The treatment of choice for venous ulceration uncomplicated by other factors is graduated compression bandaging, properly applied and combined with exercise. (Level A)</i></p> <ul style="list-style-type: none"> ■ <i>In venous ulceration, high compression achieves better healing than low compression. (Level A)</i> ■ <i>Compression bandages should only be applied by a suitably trained and experienced practitioner. (Level B)</i> ■ <i>The concepts, practice, and hazards of graduated compression should be fully understood by those prescribing and fitting compression stockings. (Level B)</i> ■ <i>Ankle circumference should be measured at a distance of 2.5 cm (one inch) above the medial malleolus. (Level C)</i> 		
<p>Original Recommendations 33, 34, 35, 43 & 44 have been combined and modified to emphasize important considerations when providing compression therapy in the care of venous ulceration. This recommendation no longer addresses care of venous eczema as treatment approaches for conditions that could lead to ulceration, dermatological or otherwise, was beyond the scope of the current review. The level of evidence for original</p>		+

<p>Recommendation 44 has also been updated to reflect current knowledge. The panel notes that despite the evidence to support the use of high compression bandages for the treatment of uncomplicated venous ulcers, there is insufficient evidence to support the choice between using elastic versus non-elastic bandaging systems.</p> <p><i>Additional Literature Supports</i> Brooks et al., 2004; Edwards et al., 2005; Franks et al., 2004; Iglesias et al., 2004; Nelson, Cullum, & Jones, 2006; Nelson et al., 2004; O'Brien et al., 2003; Padberg, Johnston, & Sisto, 2004; Partsch & Partsch, 2005; Partsch et al., 2001; Polignano et al., 2004; Polignano, Guarnera, & Bonadeo, 2004</p>	+
<p>Recommendation 24</p> <p><i>External compression applied using various forms of pneumatic compression pumps can be indicated for individuals with chronic venous insufficiency.</i></p> <p style="text-align: right;"><i>(Level A)</i></p>	
<p>The wording of this recommendation has been modified to emphasize the need for clinical judgement in determining whether this treatment is appropriate for a particular client. The change in the wording is for clarification only, and there has been no change in the intent of the recommendation.</p>	+
<p>Recommendation 25</p> <p><i>The client should be prescribed regular vascular exercise by means of intensive controlled walking and exercises to improve the function of the ankle joint and calf muscle pump.</i></p> <p style="text-align: right;"><i>(Level A)</i></p>	
<p>The wording of this recommendation has been modified for anatomical accuracy. The change in the wording is for clarification only, and there has been no change in the intent of the recommendation.</p> <p><i>Additional Literature Supports</i> Edwards et al., 2005; Padberg, Johnston, & Sisto, 2004.</p>	+
<h2>Practice Recommendations: Complementary Therapies</h2>	
<p>Recommendation 26</p> <p><i>Consider electrical stimulation in the treatment of venous leg ulcers.</i></p> <p style="text-align: right;"><i>(Level B)</i></p>	✓
<p><i>Additional Literature Supports</i> Cherry & Ryan, 2005</p>	+
<p>Recommendation 27</p> <p><i>Therapeutic ultrasound may be used to reduce the size of chronic venous ulcers.</i></p> <p style="text-align: right;"><i>(Level A)</i></p>	✓
<h2>Practice Recommendations: Reassessment</h2>	
<p>Recommendation 28</p> <p><i>If signs of healing are not evident, a comprehensive assessment and re-evaluation of the treatment plan should be carried out at three month intervals, or sooner if clinical condition deteriorates.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	

<p>The wording of this recommendation has been modified to indicate the importance of wound assessment in determining healing. Recommendation 3 (page 4 of this supplement) addresses aspects of ulcer assessment. An improvement in these attributes indicates healing. If an improvement in these attributes is not evident, or if ulcer condition worsens, a comprehensive patient assessment is warranted. The change in the wording is for clarification only, and there has been no change in the intent of the recommendation.</p> <p><i>Additional Literature Supports</i> Flanagan, 2003; Prodigy, 2004</p>	+
<p>Recommendation 29</p> <p><i>For resolving and healing venous leg ulcers, routine assessment at six-month intervals should include:</i></p> <ul style="list-style-type: none"> ■ <i>physical assessment;</i> ■ <i>Ankle Brachial Pressure Index (ABPI);</i> ■ <i>replacement of compression stockings; and</i> ■ <i>reinforcement of teaching.</i> <p style="text-align: right;"><i>(Level C)</i></p>	✓
<p><i>Additional Literature Supports</i> Prodigy, 2004</p>	+
<p>Practice Recommendations: Client Education for Secondary Prevention</p>	
<p>The section heading was modified to emphasize the importance of client education as a valuable means to promoting effective preventative measures.</p>	+
<p>Recommendation 30</p> <p><i>Inform the client of measures to prevent recurrence after healing:</i></p> <ul style="list-style-type: none"> ■ <i>daily wear of compression stockings, cared for as per manufacturer's instructions and replaced at a minimum every six months;</i> ■ <i>discouragement of self-treatment with over-the-counter preparations;</i> ■ <i>avoidance of accidents or trauma to legs;</i> ■ <i>rest periods throughout the day with elevation of affected limb above level of heart;</i> ■ <i>early referral at first sign of skin breakdown or trauma to limb;</i> ■ <i>need for exercise and ankle-joint mobility;</i> ■ <i>appropriate skin care avoiding sensitizing products; and</i> ■ <i>compression therapy for life with reassessment based on symptoms.</i> <p style="text-align: right;"><i>(Level C)</i></p>	
<p>This recommendation has been modified to incorporate Recommendations 46, 47, 56 and 57 from the original publication, thereby providing a concise list of essential attributes of patient education with regards to secondary prevention of leg ulcers. Furthermore, although it is recognized that compression therapy for life is a common preventative strategy, the recommendation has also been modified to emphasize the importance of reassessment given the potential for changing client needs. Appendix S (page 19 of this supplement) provides a Client Education Checklist to support the implementation of this recommendation.</p> <p><i>Additional Literature Supports</i> Edwards et al., 2005; Prodigy, 2004</p>	+

Education Recommendations		
<p>Recommendation 31</p> <p><i>Guidelines are more likely to be effective if they take into account local circumstances and are disseminated by an ongoing education and training program.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>		✓
<p>Additional Literature Supports</p> <p>Brooks et al., 2004; McGuckin et al., 2001</p>		+
<p>Recommendation 32</p> <p><i>Using principles of adult learning, present information at an appropriate level for the target audience, including healthcare providers, clients, family members and caregivers.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>		
<p>The wording of this recommendation has been modified to emphasize the importance of considering adult learning principles when designing educational programs. The change in the wording is for clarification only, and there has been no change in the intent of the recommendation.</p> <p>Additional Literature Supports</p> <p>Brooks et al., 2004; McGuckin et al., 2001</p>		+
<p>Recommendation 33</p> <p><i>All healthcare professionals who manage lower limb ulcers should be trained in leg ulcer assessment and management.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>		
<p>The wording of this recommendation has been modified to recognize that particular health care professionals, and not necessarily all health professionals, require specialized training in leg ulcer care. The change in the wording is for clarification only, and there has been no change in the intent of the recommendation.</p> <p>Additional Literature Supports</p> <p>Brooks et al., 2004</p>		+
<p>Recommendation 34</p> <p><i>Design, develop, and implement educational programs that reflect a continuum of care. The program should begin with a structured, comprehensive, and organized approach to prevention and should culminate in effective treatment protocols that promote healing as well as prevent recurrence.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>		✓
<p>Recommendation 35</p> <p><i>Education programs for healthcare professionals who manage lower limb ulcers should include:</i></p> <ul style="list-style-type: none"> ■ <i>pathophysiology of leg ulceration;</i> ■ <i>leg ulcer assessment;</i> ■ <i>need for Doppler ultrasound to measure Ankle Brachial Pressure Index (ABPI);</i> ■ <i>normal and abnormal wound healing;</i> ■ <i>compression therapy theory, management, and application;</i> ■ <i>dressing selection;</i> ■ <i>principles of debridement;</i> ■ <i>principles of cleansing and infection control;</i> ■ <i>skin care of the lower leg;</i> 		

<ul style="list-style-type: none"> ■ <i>peri-wound skin care and management;</i> ■ <i>psychological impact of venous stasis disease;</i> ■ <i>quality of life;</i> ■ <i>pain management;</i> ■ <i>teaching and support for care provider;</i> ■ <i>health education;</i> ■ <i>preventing recurrence;</i> ■ <i>principles of nutritional support with regard to tissue integrity;</i> ■ <i>mechanisms for accurate documentation and monitoring of pertinent data, including treatment interventions and healing progress; and</i> ■ <i>criteria for referral for specialized assessment.</i> <p style="text-align: right;"><i>(Level C)</i></p>	
<p>The wording of this recommendation has been modified to recognize that particular healthcare professionals, and not necessarily all health professionals, require specialized training in leg ulcer care. The change in the wording is for clarification only, and there has been no change in the intent of the recommendation.</p>	+
<p>Recommendation 36</p> <p><i>Healthcare professionals with recognized training in leg ulcer care should mentor and transfer their knowledge and skills to local healthcare teams.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	
<p>This wording of this recommendation was modified to suggest the means by which healthcare professionals can disseminate their specialized knowledge and skill regarding leg ulcer care. The change in the wording is for clarification only, and there has been no change in the intent of the recommendation.</p>	+
<p>Recommendation 37</p> <p><i>The knowledge and understanding of the healthcare professional is a major factor in adherence to treatment regimens.</i></p> <p style="text-align: right;"><i>(Level C)</i></p>	✓
<p>Additional Literature Supports</p> <p>Brooks et al., 2004; McGuckin et al., 2001</p>	+
<h2>Organization and Policy Recommendations</h2>	
<p>Recommendation 38</p> <p><i>Successful implementation of a venous ulcer treatment policy/strategy requires:</i></p> <ul style="list-style-type: none"> ■ <i>dedicated funding</i> ■ <i>integration of healthcare services</i> ■ <i>support from all levels of government</i> ■ <i>management support</i> ■ <i>human resources</i> ■ <i>financial resources</i> ■ <i>functional space</i> ■ <i>commitment</i> ■ <i>collection of baseline information about vulnerable populations</i> ■ <i>resources and existing knowledge</i> ■ <i>interpretation of above data and identification of organizational problems.</i> <p style="text-align: right;"><i>(Level C)</i></p>	✓

Recommendation 39

Nursing best practice guidelines can be successfully implemented only where there are adequate planning, resources, organizational and administrative support, as well as appropriate facilitation. Organizations may wish to develop a plan for implementation that includes:

- *An assessment of organizational readiness and barriers to education.*
- *Involvement of all members (whether in a direct or indirect supportive function) who will contribute to the implementation process.*
- *Dedication of a qualified individual to provide the support needed for the education and implementation process.*
- *Ongoing opportunities for discussion and education to reinforce the importance of best practices.*
- *Opportunities for reflection on personal and organizational experience in implementing guidelines.*

In this regard, RNAO (through a panel of nurses, researchers and administrators) has developed the Toolkit: Implementation of Clinical Practice Guidelines, based on available evidence, theoretical perspectives and consensus. The RNAO strongly recommends the use of this Toolkit for guiding the implementation of the best practice guideline on Assessment and Management of Venous Leg Ulcers.

(Level C)



Implementation Strategies

The Registered Nurses' Association of Ontario and the guideline panel have compiled a list of implementation strategies to assist health care organizations or health care disciplines who are interested in implementing this guideline. A summary of these strategies follows:

- Have at least one dedicated person such as an advanced practice nurse or a clinical resource nurse who will provide support, clinical expertise and leadership. The individual should have good interpersonal, facilitation and project management skills.
- Conduct an organizational needs assessment related to the care of adults with leg ulcers to identify current knowledge base and further educational requirements.
- Create a vision to help direct the change effort and develop strategies for achieving and sustaining the vision.
- Establish a steering committee comprised of key stakeholders and interdisciplinary members committed to leading the change initiative. Identify short term and long-term goals.
- Identify and support designated best practice champions on each unit to promote and support implementation. Celebrate milestones and achievements, acknowledging work well done (Davies & Edwards, 2004).
- Provide organizational support such as having the structures in place to facilitate best practices in leg ulcer care. For example, having an organizational philosophy that reflects the value of best practices through policies and procedures. Develop new assessment and documentation tools (Davies & Edwards, 2004).

Research Gaps and Implications

In reviewing the evidence for the revision of this guideline, it is clear that future research opportunities involve:

- Effective training strategies to improve clinician skill in providing compression therapy
- Evaluation of the effect of practice guidelines on delivery of care, adherence to treatment, and recurrence
- The effect of preventative measures and healthy lifestyles on rates of recurrence
- The effect of various follow-up practices and policies on rates of recurrence
- Further treatment interventions to improve rates of healing
- Comparing overall healthcare costs of prevention versus treatment

Some of the recommendations in this guideline are based on consensus or expert opinion. Further substantive research is required to validate the expert opinion. Increasing the research can impact knowledge that will lead to improved practice and outcomes for patients with venous leg ulcers.

Deleted Recommendations

In order to maintain the clarity and rigour of this practice guideline, the following recommendations from the original publication were withdrawn as part of the revision process based on panel consensus and current research evidence, where indicated.

Recommendation 25

Biological wound coverings and growth factor treatments should not be applied in cases of wound infection. (Level C)

This recommendation was removed as it was considered too limited in scope. It has been more appropriately integrated into the discussion of revised Recommendation 20 (page 8 of this supplement), where it is described that wound infection may impact on the appropriateness of several different treatment options.

Recommendation 28

An infection is indicated when $>10^6$ bacteria/gram tissue is present. (Level B)

This recommendation was removed as it is a definition of infection and not a recommendation for practice. Clinical assessment of infection is addressed in revised Recommendation 20 (page 8 of this supplement).

Recommendation 32

Topical antibiotics and antibacterial agents are frequent sensitizers and should be avoided. (Level B)

This recommendation was removed because it no longer reflects current knowledge and clinical practice. Topical antibiotics and antibacterial agents have a wide range of characteristics and may not all be frequent sensitizers and may not all have to be avoided. The appropriateness and safety of these agents in the management of venous leg ulcers should be based on consideration of the particular client, clinician and product. The recommendation to avoid topical antibiotics and antibacterial agents that are known to cause skin sensitivity is reflected in the revised Recommendation 14 (page 6 of this supplement).

Recommendation 36

Venous ulceration should be treated with high compression bandaging to achieve a pressure between 35-40 mmHg, at the ankle, graduating to half at calf in the normally shaped limb, as per La Place's Law. (Level C)

This recommendation was removed based on the difficulty of evaluating these measurements in clinical practice.

Recommendation 37

Use protective padding over bony prominences when applying high compression. (Level C)

This recommendation was removed based on its high specificity towards certain products. The practice of using protective padding over bony prominences may be contraindicated or inappropriate based on the particular compression therapy products being used.

Recommendation 38

Arterial insufficiency is a contraindication to the use of high compression. A modified form of compression may be used under specialist supervision. (Level C)

This recommendation was removed based on the ambiguity related to what constitutes appropriate compression therapy in the cases of arterial insufficiency. As such, this recommendation was considered difficult to apply to clinical practice. The caution required related to the application of compression therapy in these cases has been incorporated into the revised Recommendation 5.

Recommendation 39

Use compression with caution in clients with diabetes, those with connective tissue disease and the elderly. (Level C)

This recommendation was removed based on the ambiguity related to what constitutes appropriate compression therapy in the cases of diabetes, those with connective tissue disease and the elderly.

Recommendation 40

Compression therapy should be modified until clinical infection is treated. (Level C)

This recommendation was removed based on a lack of evidence to support the modification of compression therapy based on the presence of clinical infection alone. Such intervention is considered part of clinical decision making based on a comprehensive physical assessment.

Recommendation 41

Bandages should be applied according to manufacturer's recommendations. (Level C)

This recommendation was removed as it is more appropriately a standard of practice regarding safe product usage and not a recommendation for practice.

Recommendation 42

When using elastic systems such as "high compression" bandages, the ankle circumference must be more than or padded to equal 18cms. (Level C)

This recommendation was removed based on its high specificity towards certain products. Circumference specifications may differ based on the particular compression bandaging systems used.

Recommendation 45

Graduated compression hosiery should be measured and fitted by a certified fitter. (Level C)

This recommendation was removed by panel consensus as its meaning is reflected in the revised Recommendation 23.

Recommendation 47

Graduated compression hosiery should be prescribed for life. (Level C)

This recommendation was combined into the revised Recommendation 36 to emphasize the role of ongoing compression therapy as part of secondary prevention for future venous leg ulcers as well as the need for ongoing reassessment based on changes in the client's condition.

Recommendation 51

Hyperbaric oxygen may reduce ulcer size in non-diabetic, non-atherosclerotic leg ulcers. (Level A)

This recommendation was removed as it is no longer supported by current evidence. A recent systematic review indicates that hyperbaric oxygen may reduce amputation in patients with diabetic foot ulcers, but the effect of this therapy on venous ulcers is not clear (Kranke et al., 2006).

Recommendation 55

Measures to prevent recurrence of a venous leg ulcer include: wearing compression stockings, regular follow-up to monitor Ankle Brachial Pressure Index (ABPI), discouragement of self-treatment with over-the-counter preparations, and avoidance of accidents or trauma to legs. (Level C)

This recommendation, except for the component regarding follow-up ABPI measurement, was combined into the revised Recommendation 36 to reflect that secondary prevention from the clinician's perspective most commonly involves patient education of preventative measures. Although it is recognized that measurement of Ankle Brachial Pressure Index (ABPI) may be included as part of a comprehensive reassessment, this follow-up measure is not considered part of routine preventative care unless indicated by a change in client condition, such as the emergence of symptoms or skin breakdown.

Appendices

The review/revision process identified a need for updates to the Glossary and the inclusion of additional appendices:

Appendix B: Glossary of Terms

The glossary has been updated to add:

Bacterial Balance: The bacterial level present in a wound and their ability to cause damage or infection. The impact of these bacteria on healing is dependent on several factors, including the number of organisms, the virulence of these organisms and host resistance (Sibbald, Woo, & Ayello, 2006).

Moisture Balance: The management of exudate and maintenance of fluids in the wound bed. When healing is the goal, a balanced moist wound environment ensures that there is sufficient moisture to facilitate cellular growth but not in excess to cause further skin breakdown.

Appendix M: Physical Findings of Venous Disease versus Arterial Disease

Physical Findings of Venous Disease versus Arterial Disease

Venous Disease	Arterial Disease
Usually shallow, moist ulcers	Ulcers with a “punched out” appearance
Situated on gaiter area of leg	Base of wound poorly perfused, pale, dry
Edema	Cold legs/feet (in a warm environment)
Eczema	Shiny, taut skin
Ankle flare	Dependent rubor
Lipodermatosclerosis	Pale or blue feet
Varicose veins	Gangrenous toes
Hyperpigmentation	
Atrophie blanche	

Source: RNAO, 2004

Appendix N: Factors Affecting Healing Potential

Factors Affecting Healing Potential

Local	Host	Environment
<ul style="list-style-type: none"> ■ Necrosis ■ Infection ■ Microvascular supply ■ Foreign body ■ Iatrogenic <ul style="list-style-type: none"> • Cytotoxic agents 	<ul style="list-style-type: none"> ■ Co-morbidities <ul style="list-style-type: none"> • Inflammatory condition • Nutrition • Peripheral vascular disease • Coronary artery disease ■ Adherence to plan of care ■ Cultural/personal beliefs 	<ul style="list-style-type: none"> ■ Access to care ■ Family support ■ Healthcare sector ■ Geographic ■ Socioeconomic status

Adapted from RNAO, 2005.

Appendix O: Preparing the Wound Bed

Preparing the Wound Bed: Clinical and Physiological Mechanisms of Action

Clinical Observations	Molecular and Cellular Problems	Clinical Actions	Effect on Clinical Actions	Clinical Outcome
Debridement	Denatured matrix and cell debris impair healing	Debridement (episodic or continuous) autolytic, sharp surgical, enzymatic, mechanical or biological	Intact, functional extracellular matrix proteins present in wound base	Viable wound base
Infection, inflammation	High bacteria, cause ↑ inflammatory cytokines ↑ proteases ↓ growth factor activity ↓ healing environment	Topical/systemic antimicrobials anti-inflammatories protease inhibitors growth factors	Low bacteria, cause ↓ inflammatory cytokines ↓ proteases ↑ growth factor activity ↑ healing environment	Bacterial balance and reduced inflammation
Moisture imbalance	Dessication slows epithelial cell migration Excessive fluid causes maceration of wound base/margin	Apply moisture-balancing dressings	Dessication avoided Excessive fluid controlled	Moisture balance
Edge of wound – non-advancing or undermined	Non-migrating keratinocytes Non-responsive wound cells, abnormalities in extracellular matrix or abnormal protease activity	Reassess cause, refer or consider corrective advanced therapies: • bioengineered skin • skin grafts • vascular surgery	Responsive fibroblasts and keratinocytes present in wound	Advancing edge of wound

Source: Sibbald et al., 2006. Reproduced with permission.

Appendix P: Key Factors in Deciding Method of Debridement

Key Factors in Deciding Method of Debridement

	Surgical	Enzymatic	Autolytic	Biologic	Mechanical
Speed	1	3	5	2	4
Tissue selectivity	3	1	4	2	5
Painful wound	5	2	1	3	4
Exudate	1	4	3	5	2
Infection	1	4	5	2	3
Cost	5	2	1	3	4

Source: Sibbald et al., 2006. Reproduced with permission.

Where 1 is most desirable and 5 is least desirable.

Appendix Q: Signs and Symptoms of Venous Leg Ulcer Infection

Signs and Symptoms of Venous Leg Ulcer Infection

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Local	Systemic
Increased pain	Fever
New areas of wound breakdown	Rigors
Friable granulation tissue	Chills
Foul odour	Hypotension
Increased exudate	
Bright red granulation tissue	
Bridging of soft tissue and epithelium	
Erythema >2cm beyond the border of the wound	
Increase in ulcer size	

References: Cutting & Harding, 1994; Gardner et al., 2001; Sibbald et al., 2006

Appendix R: Antiseptic Use

Antiseptic Use

Compiled by P. Coutts & L. Teague (2007). Published with permission.

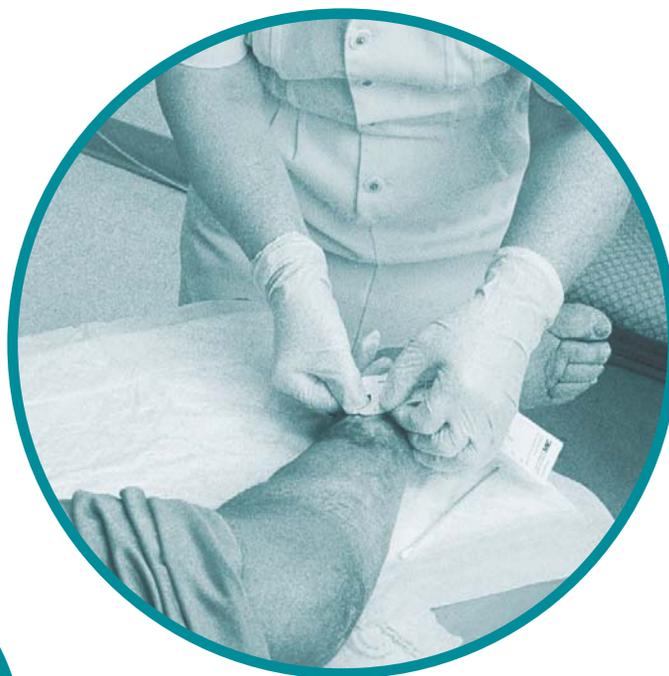
Antiseptic	In-vitro studies support use	In-vivo studies support use	Requires more human trials to assess efficacy and safety	Level of Evidence
Acetic Acid 0.25% or 0.5%	✓	✓		A
Chlorhexadine 0.05% or 0.2%	✓	✓	✓	
Silver Compounds	✓	✓		A
Povidone Iodine	✓	✓	✓	
Cadexomer Iodine	✓	✓		A
Hydrogen Peroxide 3% solution			✓	

Adapted from Drosou, Falabella & Krisner, 2003.

Appendix S: Client Education Checklist

Inform the client of measures to prevent recurrence after healing:	
✓	
	Daily wear of compression stockings, cared for as per manufacturer's instructions and replaced at a minimum every six months
	Discouragement of self-treatment with over-the-counter preparations
	Avoidance of accidents or trauma to legs
	Rest periods throughout the day with elevation of affected limb above level of heart
	Early referral at first sign of skin breakdown or trauma to limb
	Need for exercise and ankle-joint mobility
	Appropriate skin care avoiding sensitizing products
	Compression therapy for life with reassessment based on symptoms

(RNAO Consensus Panel, 2007)



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