

# WHAM Evidence summary: Venous leg ulcers: Leg care: Elevation and skin hygiene

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## CLINICAL QUESTIONS

What is the best available evidence on effectiveness of leg elevation for healing venous leg ulcers (VLUs)?

What is the best available evidence on effectiveness of skin hygiene for healing VLUs?

## KEYWORDS

Venous leg ulcer, leg ulcer, compression bandages, 4-layer, long stretch

## SUMMARY

Venous leg ulcers (VLUs) are chronic wounds that occur on the lower leg due to venous disease (*Level 1*). Self-care activities such as leg elevation and performing skin hygiene are recommended practice for people with VLUs, to be implemented in conjunction with other important interventions such as compression therapy and physical exercise. A small body of evidence indicates that leg elevation increases microcirculation and improves venous symptoms<sup>1-3</sup> (*Levels 2 and 3*). Leg elevation may also prevent recurrence of a VLU<sup>4</sup> (*Level 3*), but there is

currently no evidence that elevation increases VLU healing rates. Skin hygiene practices, specifically using pH neutral cleansers and moisturisers on a daily basis, are considered important self-care activities to maintain skin integrity,<sup>5, 6</sup> but there is currently no clinical evidence on effectiveness in addressing signs and symptoms of venous disease, including ulceration (*Level 5*).

## CLINICAL PRACTICE RECOMMENDATIONS

All recommendations should be applied with consideration to the wound, the person, the health professional and the clinical context:

**Advise people with VLUs to practice leg elevation on a daily basis for a total of 60 minutes or longer in 2 to 3 sessions, if their daily routine allows (Grade B).**

**People with VLUs should use a pH appropriate skin cleanser (Grade B).**

**People with VLUs should moisturise the skin with a pH appropriate skin moisturiser (Grade B).**

**People with VLUs should be informed about their disease and implementing lifestyle interventions (Grade B).**

**Suggest that people with VLUs record their self-care activities in a diary as a prompt to maintain adherence to practice (Grade B).**

**Table 1: Sources of evidence and the level**

Level 1 Evidence	Level 2 Evidence	Level 3 Evidence	Level 4 Evidence	Level 5 Evidence
<b>Experimental Designs</b>	<b>Quasi-experimental Designs</b>	<b>Observational – Analytic Designs</b>	<b>Observational –Descriptive Studies</b>	<b>Expert Opinion/ Bench Research</b>
1.a Systematic review of RCTs <sup>11</sup> 1.b Systematic review of RCTs and other designs <sup>10</sup>	2.a Systematic review of quasi-experiments <sup>12, 13</sup> 2.d Pre-test Post-test pr retrospective control group study <sup>1</sup>	3.c Cohort study with control group <sup>3</sup> 3.e Observational study <sup>2, 4, 14</sup>	None	5.b Expert consensus <sup>5, 15</sup> 5.c Single expert opinion/bench research <sup>6, 16</sup>

## SOURCES OF EVIDENCE

This summary was conducted using methods published by the Joanna Briggs Institute.<sup>7-9</sup> The summary is based on a literature search using variations of the search terms describing VLU and electric stimulation. Searches were conducted in EMBASE, Medline, AMED and the Cochrane Library for evidence from 1990 to June 2018 in English. Where high level evidence was available, lower level evidence was not reviewed. Levels of evidence for intervention studies are reported in the table below.

## BACKGROUND

Venous leg ulcers occur due to venous insufficiency. Venous insufficiency describes a condition in which the venous system does not carry blood back to the heart in the most efficient manner, causing blood to pool in the veins of the lower limbs.

Venous insufficiency occurs due to:<sup>10, 11</sup>

- previous blood clots,
- impaired valves in the veins in the lower leg do not close sufficiently after each muscle contraction, allowing blood to flow back to a previous section of the vein (venous reflux), and
- calf muscle pump function not adequately assisting in returning blood to the heart.

The above pathology leads to blood pooling in the lower venous system that can also lead to oedema. Symptoms can be exacerbated by standing or sitting for long periods and can be relieved by wearing compression therapy.<sup>11</sup> Elevation is thought to be a lifestyle strategy that could relieve oedema by promoting more effective capillary and lymphatic function and venous return thereby improving symptoms of venous disease and promoting VLU healing.<sup>1, 2</sup>

Regular skin hygiene promotes skin integrity by removing sources of dirt, irritation and infection. Maintaining skin hygiene is thought to reduce dryness, erythema and irritation. This reduces the risk of infection and new skin breakdown.<sup>5</sup>

## CLINICAL EVIDENCE

### Evidence for leg elevation

Evidence from small clinical trials conducted in people with venous disease with or without ulceration shows that microcirculation flow and lymphatic function can be

improved and lower limb oedema can be reduced by elevating the legs.<sup>1, 2</sup> In one trial<sup>1</sup> (n=13), people with chronic VLUs elevated their legs at 10° continuously for 24 hours. Compared to baseline, changes in transcutaneous oxygen tension (TcPO<sub>2</sub>) and laser Doppler fluximetry indicated that individuals had significant improvements in microcirculation after the period of leg elevation. Additionally, significant reduction in lower limb volume and circumference was associated with leg elevation<sup>1</sup> (Level 2). In another trial (n=30),<sup>3</sup> people with CVI were shown to have significantly higher laser Doppler fluximetry when legs were elevated compared to lying without leg elevation (mean increase 45%, p<0.01) and blood cell velocity also significantly increased (mean increase 41%, p<0.01)<sup>3</sup> (Level 3).

Only one study has explored the influence of elevation on VLU healing.<sup>2</sup> Individuals with chronic VLUs engaged in elevation for a median of 352 minutes every 24 hours for six weeks. There was a significant reduction in median size of VLUs over time; however, there was no correlation between time spent elevating the legs and VLU healing (p=0.616)<sup>2</sup> (Level 3). Thus, although there is some evidence for physiological improvements and relieve of venous symptoms,<sup>1-3</sup> there is currently no evidence indicating this promotes more rapid VLU healing (Level 2 and 3).

One trial<sup>4</sup> has investigated the effectiveness of leg elevation in preventing VLU recurrence when initiated by people with healed VLUs. People who experienced an ulcer recurrence were significantly less likely to have practiced leg elevation for at least one hour per day (23% versus 47% for individuals with no recurrence, p<0.005)<sup>4</sup> (Level 3).

Although leg elevation is recommended as a component of best practice, there is insufficient evidence on the best regimen. In the trial that explored impact of elevation on VLU recurrence, people who engaged in leg elevation for at least 60 minutes per day had a lower recurrence rate than those who practised less frequent or shorter duration of elevation<sup>4</sup> (Level 3). Other advice includes:

- Elevate lower limbs to above the level of the heart to promote venous return, if the person has no musculoskeletal limitations.<sup>4, 6, 15, 16</sup> This is best achieved by lying on the bed<sup>16</sup> (Level 5).
- Perform elevation for at least 60 minutes throughout the day<sup>4, 6</sup> (Level 3).

- Perform elevation 3-4 times per day,<sup>15</sup> or in the afternoon<sup>6</sup> (Level 5).
- Protect the heels from pressure by floating the heels or using a heel protector legs are elevated<sup>16</sup> (Level 5).
- Removing compression prior to elevating the legs (and reapplying compression after leg elevation) may increase the impact of elevation on venous return<sup>6, 12</sup> (Level 5).

### **Evidence for skin cleansing and moisturising**

There is no evidence indicating that cleansing and moisturising the skin will promote VLU healing; however applying a skin moisturiser after cleansing and gently drying the legs may relieve some venous symptoms by reducing irritation and dryness. Consensus opinion<sup>5, 6</sup> provides guidance on general skin hygiene, suggesting that cleansing with a pH appropriate cleanser (from 4.0 to 7.0) is best practice in skin and wound care. A skin cleanser should be pH appropriate to avoid skin dryness and irritation that can occur with a higher pH soap.<sup>5</sup> Application of a pH appropriate moisturiser is also recommended as best practice in skin and wound care.<sup>5, 6</sup> (Level 5).

### **Sustainability of elevation and hygiene interventions**

Education interventions have been associated with improving adherence to leg elevation. A systematic review<sup>13</sup> reported that people with VLUs who participated in a nurse-led behavioural education program raised their legs for longer durations than people who received no reinforcing education (Level 2). An Australian study<sup>14</sup> also found that participation in an education program (a web-based learning package over six weeks) was associated with an initial increase in the practice of leg elevation, and some improvement in adherence to practice was sustained for up to 9 months ( $p=0.005$ )<sup>14</sup> (Level 3). Both the systematic review<sup>13</sup> and the study suggested that adherence may be higher when a daily diary is used to self-record performance of lifestyle interventions (Levels 2 and 3).

The same Australian study<sup>14</sup> found similar increase in skin hygiene practices (applying a soap substitute and moisturiser) immediately after completing the six-week learning program. After 8-9 months, there was no significant increase in percent of participants still engaging in cleansing with soap substitute ( $p=0.642$ ) or applying moisturiser ( $p=0.053$ ). However, level of

participation in these activities was over 60% at baseline<sup>14</sup> (Level 3).

### **CONFLICTS OF INTEREST**

The author declares no conflicts of interest in accordance with International Committee of Medical Journal Editors (ICMJE) standards.

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### **ABOUT WHAM EVIDENCE SUMMARIES**

WHAM evidence summaries are consistent with methodology published in

Munn Z, Lockwood C, Moola S. The development and use of evidence summaries for point of care information systems: A streamlined rapid review approach, *Worldviews Evid Based Nurs*. 2015;12(3):131-8.

Methods are provided in detail in resources published by the Joanna Briggs Institute as cited in this evidence summary. WHAM evidence summaries undergo peer-review by an international review panel. More information is available on the WHAM website: <https://www.whamwounds.com/>.

WHAM evidence summaries provide a summary of the best available evidence on specific topics and make suggestions that can be used to inform clinical practice. Evidence contained within this summary should be evaluated by appropriately trained professionals with expertise in wound prevention and management, and the evidence should be considered in the context of the individual, the professional, the clinical setting and other relevant clinical information.

### **PUBLICATION**

This evidence summary has been published in *Wound Practice and Research*:

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