Venous Ulcer Care – what we know and what we don’t

Katja S. Mühlberg

University of Leipzig
Angiology
Department of Neurology, Internal Medicine and Dermatology
Disclosure

Speaker name:
Katja S. Mühlberg

I have the following potential conflicts of interest to report:

☐ Consulting
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☐ Other(s)

☑️ I do not have any potential conflict of interest
Early endovenous ablation of superficial venous reflux improves ulcer healing.

![Kaplan-Meier Curves for Time to Ulcer Healing in the Two Treatment Groups.](image)

<table>
<thead>
<tr>
<th>Time Parameter</th>
<th>Early Intervention</th>
<th>Deferred Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to ulcer healing</td>
<td>56 d</td>
<td>82 d</td>
</tr>
<tr>
<td>Rate of ulcer healing at week 24</td>
<td>85.6%</td>
<td>76.3%</td>
</tr>
<tr>
<td>Ulcer-free 1 year follow-up</td>
<td>306 d</td>
<td>278 d</td>
</tr>
<tr>
<td>QoL</td>
<td>no difference</td>
<td>no difference</td>
</tr>
</tbody>
</table>

Gohel MS et al. NEJM 2018;378:2105-14.
Early endovenous ablation of superficial venous reflux improves ulcer healing.

Inclusion criteria:
- ulcer size (2.4–2.9 cm²)
- ulcer duration (3 mo.)
- different methods (laser/RF ablation, foam, glue, mechanochemical…)

We know:
Larger and long-standing ulcers are negative prognostic markers for healing.

What we don’t know:
- effect on larger ulcer size?
- effect on long-standing ulcers?
- long-term results?
- which method is the best choice
- effect of conventional venous surgery?

Gohel MS et al. NEJM 2018;378:2105-14.
Venous hypertension impaires venous ulcer healing. 
Venous pressure drops during ambulation.

→ calf muscle pump failure
  • muscle wasting
  • immobility
  • fixed ankle joint

Venous pressure drops during ambulation.

What we don’t know: Is there an impact of ambulation on ulcer healing?

Outlook:

**neuromuscular stimulation device**
- small, wireless, worn at the knee, weight 10g
- stimulates the common peroneal nerve (firing once per second)
- increases lower leg blood circulation up to 60% achieved by walking

**Pilot study**
- n=12 non-healing ven./lymph. ulcers
- devices were used 5 days per week for 6 hours each day on both legs
- standard wound care + compression
Venous pressure drops during ambulation.

What we don’t know: Is there an impact of ambulation on ulcer healing?

- Healing rate per week [%]
  - Before stimulation: 0.06
  - With stimulation: 9.35

- Cumulative proportion healed [%]
  - 12 weeks: 22
  - 20 weeks: 44

- Ulcer healing status through 20 weeks
  - Healed: 44
  - Improving: 39
  - Deteriorating: 17

Venous pressure drops during ambulation.

What we don’t know:
Does an exercise regimen adjuvant to compression therapy increase ulcer healing compared with compression alone?

Progressive resistance exercise:
10-25x repetitions of seated heel raises
3 times per day

Physical activity:
30min. walking free or on treadmill or cycling
3 times per week
(supervised or at home)

Jull A et al. JAMA Dermatol 2018; 154 (11) 1304-11
Venous pressure drops during ambulation.

What we don’t know:
Does an exercise regimen adjuvant to compression therapy increase ulcer healing compared with compression alone?

Jull A et al. JAMA Dermatol 2018; 154 (11) 1304-11

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Exercise</th>
<th>No Exercise</th>
<th>Risk Difference M-H, Fixed, (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Events</td>
<td>Total No.</td>
<td>No. of Events</td>
</tr>
<tr>
<td>1.1.1 Progressive resistance exercise</td>
<td>Jull et al, 24 2009</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>O’Brien et al, 26 2013</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Total (95% CI)</td>
<td>11</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Heterogeneity: ( \chi^2 = 1.36, \text{ df} = 1 (P = .24); I^2 = 26% )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test for overall effect: ( z = .43 (P = .67) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.2 Progressive resistance exercise and physical activity</td>
<td>Klonizakis et al, 28 2009</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>O’Brien et al, 27 2017</td>
<td>22</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Total (95% CI)</td>
<td>31</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Heterogeneity: ( \chi^2 = .64, \text{ df} = 1 (P = .42); I^2 = 0% )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test for overall effect: ( z = 2.90 (P = .004) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.3 Walking 10 000 steps</td>
<td>Meagher et al, 25 2013</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Total (95% CI)</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test for overall effect: ( z = .51 (P = .61) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total (95% CI)</td>
<td>57</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>Heterogeneity: ( \chi^2 = 6.43, \text{ df} = 4 (P = .17); I^2 = 38% )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test for overall effect: ( z = 2.90 (P = .04) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test for subgroup differences: ( \chi^2 = 4.31, \text{ df} = 2 (P = .12); I^2 = 53.6% )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- adjuvant exercise increases healing rates at 12 weeks (except heel raising alone without supervision).
- Seated heel raising plus physical activity had the strongest association with healing.
The evidence base is growing for incorporating exercise into venous ulcer treatment.

Venous pressure drops during ambulation.

What we don’t know:
Is there an impact of ambulation and physical exercise on ulcer healing?
Debridement is necessary, effective and improves ulcer healing.

What we don’t know:
Is there really good evidence and how do different methods compare?

methods:
• surgical or sharp debridement (scalpel, abrasor)
• mechanical debridement (washing solutions and dressings)
• biosurgical debridement (maggots)
• enzymatic debridement (enzymes to break down tissue)
• autolytic debridement (moist dressings and natural agents or both, to stimulate the wound’s own healing processes)

Cochrane Review:
Although 10 RCTs involving 715 participants were included, no meta-analysis was possible and the review reveals a very limited evidence base for debridement.

Compression therapy is essential for venous ulcer healing. What we don’t know: Which method is the most effective?

Compression?

stockings vs. bandages

4layer bandaging vs. systems with < 4layers

short stretch bandages vs. long stretch bandages

- ulcer healing?
- time to healing?
- ulcer recurrence outcomes?
Compression therapy is essential for venous ulcer healing. What we don’t know: Which method is the most effective?

- no difference in:
  - ulcer healing
  - time to healing

- no data in:
  - ulcer recurrence

Mauck KF et al. J Vasc Surg 2014 (60) 2S, 71S-90S
Compression therapy is essential for venous ulcer healing. What we don’t know: Which method is the most effective?

→ no difference in:
- ulcer healing
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Mauck KF et al. J Vasc Surg 2014 (60) 2S, 71S-90S
Compression therapy is essential for venous ulcer healing. What we don´t know: Which method is the most effective?

At least moderate –quality evidence supports compression over no compression without significant difference between the methods.

Low-quality evidence supports the compression effect on ulcer recurrence.

Compression therapy is essential after superficial vein treatment. What we don´t know: Which class of compression?
Compression therapy is essential after superficial vein treatment. What we don’t know: Which class of compression?

- prospective, randomized, a 5-year follow-up
- knee-high compression hosiery (class 2 vs. class 3)
- n=308
- after 5 years:
  → ulcer recurrence  ccl 2: 60%  ccl 3: 29%
  → non-compliance  ccl 2: 6.3%  ccl 3:10.2%

What we don’t know: Are we really talking about the same compression strength/level all over the world?

<table>
<thead>
<tr>
<th>Class</th>
<th>Pressure at ankle [mmHg]</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>20 (18-21)</td>
<td>varicous veins, venous ulcer</td>
</tr>
<tr>
<td>II</td>
<td>30 (23-32)</td>
<td>varicous veins, venous ulcer</td>
</tr>
<tr>
<td>III</td>
<td>40 (34-46)</td>
<td>venous ulcer, lymphoedema</td>
</tr>
<tr>
<td>IV</td>
<td>&gt;49</td>
<td>lymphoedema</td>
</tr>
</tbody>
</table>
What we don’t know: Are we really talking about the same compression strength/level all over the world?

No guideline clearly recommends the dose of compression in VLU.

To occlude a vein in standing or sitting position a pressure of >50mmHg is required in the lower leg and 30-40mmHg at thigh.

→ Comparing apples to pears??

Compression therapy is essential for venous ulcer healing. What we don’t know: How many patients are correctly treated at all?

→ only 31% VLU receive compression therapy
→ practical skills:
  • compression bandage with target pressure of 50mmHg achieved by 12.2%
  • 68.9% below the target
  • range between 7 and 173mmHg (!)

The system is capable of reporting instantaneous changes in bandage pressure, moisture level and local temperature at wound site.

Protz K et al. J German Soc Dermatol 2016, 1273-82
Heyer K et al. Int Wound J 2017; 14:1148–1153
Guidelines recommend ABI measurement in VLU patients, because PAD is a significant but often unrecognized reason for impaired ulcer healing. What we don’t know: Why are these recommendations often ignored?

Only 30% of VLU patients are referred to vascular diagnostics.

→ up to 25% VLU patients have a concomitant PAD!
There is a urgent need for education &
• adequately powered
• high-quality
• randomized controlled trials
comparing different diagnostic and treatment options
with reporting outcomes including
• time to ulcer healing
• ulcer recurrence
• adverse events
• QoL
• cost effectiveness.

Summary
What we know…

Let’s meet and see (new results?)
next LINC 2020 in Leipzig!
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