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GUIDELINE

Diagnosis and treatment of venous leg ulcers: S2k Guideline of the German Society of Phlebology and Lymphology (DGPL) e.V.

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German Society of Phlebology and Lymphology (DGPL)

German Dermatological Society (DDG)

German Society for General Medicine (DEGAM)

German Society for Angiology (DGA)

German Society for Vascular Surgery and Vascular Medicine (DGG)

German Society for Surgery (DGCH)

German Society for Dermatosurgery (DGDC)

German Society for Wound Healing and Wound Treatment (DGfW)

Professional Association of Phlebologists and Lymphologists (BVPL)

Initiative Chronische Wunden (ICW)

Summary

This S2k guideline on venous leg ulcers was created on the initiative and under the leadership of the German Society of Phlebology and Lymphology (DGPL). The guideline group also consisted of representatives from the German Society for Phlebology and Lymphology, German Dermatological Society, German Society for General Medicine, German Society for Angiology, German Society for Vascular Surgery and Vascular Medicine, German Society for Surgery, German Society for Dermatosurgery, German Society for Wound Healing and Wound Treatment, Professional Association of Phlebologists and Lymphologists and Initiative Chronische Wunden.

The aim of this guideline is to combine the different approaches and levels of knowledge of the respective professional groups on the basis of consensus, so that a basic concept for the best possible treatment of patients with venous leg ulcers can be provided. A total of 70 specific recommendations were formulated and agreed upon, divided into the subject areas of diagnostics, therapy, prevention of recurrences, and everyday challenges.

The guideline thus reflects the current state of scientific knowledge and is intended to be widely used as the best available document for the treatment of patients with venous leg ulcers in everyday clinical practice.

KEYWORDS

chronic venous insufficiency, chronic wounds, compression therapy, leg ulcers, pain

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PREAMBLE

The following sections represent the short version of the S2k guideline of the German Society of Phlebology and Lymphology (DGPL). The full version is available at the AWMF under registry number 037-009.

INTRODUCTION

Venous leg ulcer (VLU) represents the most severe course of chronic venous insufficiency (CVI).[1] In Germany, approximately 0.2% of the population suffer from active VLU.[2] The prevalence increases with age to approximately 2% in individuals more than 80 years of age;[3] the recurrence rate is up to 70% within five years.[4] Apart from high age and a positive family history of VLU, an increased body-mass index (BMI) and a history of venous thrombosis are additional risk factors.[5] It has been shown that obesity may also lead to venous hypertension of the lower extremities by increasing intra-abdominal pressure and thus causing VLU. For this condition, terms such as dependency syndrome or functional CVI have been coined.[6,7] In Germany, the average costs incurred by patients with VLU amount to approximately 9,500 €/year.[8] Apart from the economic burden, the social-medical relevance of VLU is of major importance. Usually, the quality of life of affected patients is significantly impaired.[9] Especially the factors pain, odor, and exudate have a negative impact on the quality of life of affected patients and also have cumulative effects on other aspects, such as sleep, mobility, mental health, and general social life.[9]

DIAGNOSTICS

History and clinical examination

Recommendation 1	Strength	Agreement
Detailed medical history and clinical examination with inspection and palpation *shall* form the basis for the diagnosis of venous leg ulcer.	↑↑	Strong consensus (100%)

Recommendation 2	Strength	Agreement
Accompanying lymphedema *shall* be taken into account and included in the treatment concept.	↑↑	Strong consensus (100%)

The structured and ulcer-related history forms the basis for the diagnosis of patients with VLU.[10] In this context, quality of life and pain intensity should also be assessed.[11,12] During clinical inspection and palpation of both legs, cutaneous and subcutaneous signs of CVI, visible varicose veins, and edema shall be considered, in particular. Apart from edemas of venous origin, it is essential to also identify edemas in the context of other underlying diseases and accompanying lymphedema, and to include them in the therapy at an early stage, if necessary.[13] Reliable differentiation from a non-venous etiology of leg ulcer (LU) is not possible on the sole basis of inspection and palpation of the lower extremity.

Recommendation 3	Strength	Agreement
In case of evidence of a non-exclusive etiology of leg ulcer, this *shall* be analyzed further.	↑↑	Strong consensus (100%)

Given that numerous causes may induce LU independently of CVI, these should be included in the diagnostic workup at an early stage.[14]

Recommendation 4	Strength	Agreement
The staging of chronic venous insufficiency is performed according to the CEAP classification (*clinical condition, etiology, anatomic location, pathophysiology*). The clinical classification (C) *shall* and the advanced classifications (EAP) *should* be used for classification.	↑↑ ↑	Consensus (94.1%)

The internationally established CEAP classification[1,15] should be used for the staging of CVI.

The predilection sites of VLU are localized above or behind the medial malleolus. Localization, ulcer size, wound situation, ulcer surroundings, and the clinical stigmata of CVI shall be documented during the clinical examination.[16]

Recommendation 5	Strength	Agreement
Risk factors for the manifestation of venous leg ulcer and its recurrence *shall* be considered and included in the treatment concept.	↑↑	Strong consensus (100%)

Apart from CVI-specific skin changes, a history of deep vein thrombosis with residuals, such as verifiable reflux in the deep venous system, as well as obesity and advanced age, are considered risk factors of a severe course of CVI.[17,18]

Photographic documentation

Recommendation 6	Strength	Agreement
Photographic documentation *shall* complement the written documentation at first consultation and subsequently at regular intervals; at least every 4 weeks or earlier in case of a change in findings that necessitate a change in therapy.	↑↑	Consensus (88.2%)

Photographic documentation of VLU shall be performed initially and then regularly, not later than at intervals of

4 weeks. Changes in the wound situation may necessitate additional photographic documentation.

Instrumental diagnosis

Recommendation 7	Strength	Agreement
For the initial diagnosis of venous leg ulcer and prior to invasive therapy of superficial leg veins, color-coded duplex sonography of the leg veins *shall* be performed.	↑↑	Consensus (94.1%)

Recommendation 8	Strength	Agreement
The patients *shall* not be deprived of conservative therapeutic measures, such as adequate wound care and medical compression therapy, in case of pending color-coded duplex sonography.	↑↑	Consensus (94.7%), Consensus without CI (90%)

Abbr.: CI, Conflict of Interest

Color-coded duplex sonography (CCDS) of leg veins represents the gold standard of the instrumental diagnosis in VLU. It should be used to examine both the superficial and the deep venous systems. CCDS enables the acquisition of information about the anatomy and function of deep and superficial veins, hemodynamics including potential obstructions and refluxes, and the planning of an invasive therapy, if necessary.[19] Even if diagnosis by duplex sonography is not always available everywhere in the short term, it shall at least be made available by the primary care provider in a timely manner. A limiting factor is, however, that the realization of this strong recommendation for action, while required from a medical view, is not always possible in outpatient care due to regional lack of availabilities or absence of structures. The patient shall not be deprived of conservative therapeutic measures, adequate wound care, and medical compression therapy in case of pending CCDS.

If obstruction of suprainguinal veins is suspected, [20] CT or MR venography may be performed for diagnosis and treatment planning in addition to CCDS.[20,21]

Recommendation 9	Strength	Agreement
To obtain the arterial status, the ankle-brachial index (ABI) *should* be measured in VLU in addition to palpation of foot pulses.	↑	Strong consensus (100%)

Measurement of the ankle-brachial index (ABI) by Doppler ultrasonography is a valid and easily performed method for the objectification of peripheral arterial disease (PAD). ABI values $\leq$ 0.9 indicate the presence of PAD.[22] If PAD is suspected clinically, angiological or arterial vascular medical presentation and, if necessary, co-treatment, is indicated.

Advanced diagnostics

Recommendation 10	Strength	Agreement
In case of absent healing tendency of venous leg ulcer despite guideline-conforming therapy for six weeks, diagnosis and therapy *shall* be re-evaluated.	↑↑	Strong consensus (100%)

In case of absent tendency to heal, consultant presentation or co-treatment by other disciplines, especially vascular medicine and dermatology, shall be performed at the latest after 6 weeks or at least be initiated in a medically acceptable time frame. Ulcerations with unusual course, morphology, or localization, should be evaluated at an early stage with respect to non-venous etiology, and an advanced diagnosis including histological examination should be performed.

Recommendation 11	Strength	Agreement
In case of clinical suspicion of wound infection, material for pathogen diagnosis and resistance determination *shall* be collected and the respective examinations arranged prior to systemic antibiosis.	↑↑	Strong consensus (100%)

In case of clinical suspicion of wound infection, wound cleansing shall be performed, for example, with sterile physiological saline or Ringer solution, prior to the bacteriological diagnostic workup to remove clinically irrelevant contaminants. The bacteriological swab should be collected with slight pressure over an area of approximately 1 cm^2 within the region that appears clinically infected.[23]

Recommendation 12	Strength	Agreement
Pathogen diagnostics *may* also be performed in patients without clinical signs of infection, for example, to detect hygiene-relevant or multiresistant pathogens.	↔	Consensus (94.7%)

Collection of bacteriological swabs may also be useful in patients without clinical signs of infection to detect multiresistant pathogens, such as methicillin-resistant *Staphylococcus aureus* (MRSA). This is, however, not required in all patients with VLU. No wound cleansing should be performed before obtaining swabs for this purpose.[24]

Recommendation 13	Strength	Agreement
In case of absent tendency to heal after six weeks of guideline-conforming treatment of venous leg ulcer and uncertainty with respect to the etiology, one or more tissue biopsies *should* be performed for histological examination.	↑	Consensus (89.5%)

In approximately 20% of patients with LU, there is neither a venous nor an arterial etiology.[25–27] In these cases, tissue biopsy with histological examination is useful to distinguish therapy-relevant differential diagnoses. Apart from the ulceration itself, the edge of the ulcer with intact epidermis shall also be assessed, if possible.[28]

Recommendation 14	Strength	Agreement
If a yet unidentified secondarily ulcerating neoplasm is suspected, the respective relevant diagnostic and therapeutic measures *shall* be initiated in addition to the histological examination.	↑↑	Strong consensus (100%)

The prevalence of neoplasms in LU is described as 2%–10% in the literature. Therefore, although it is a rare differential diagnosis, atypical localization of the ulceration and diverging sonographic findings will always require an advanced diagnostic workup.[30]

THERAPY

Conservative therapies

Medical compression therapy

Recommendation 15	Strength	Agreement
In the selection of compression therapy, diagnosis, symptoms, and preference of the patients, as well as experience and skill of the practitioner *shall* be considered.	↑↑	Consensus (94.4%), Consensus without CI (92.3%)

Abbr.: CI, Conflict of Interest

Various compression devices are available for medical compression therapy.[31]

Recommendation 16	Strength	Agreement
After assessment of contraindications, medical compression therapy *shall* be used as conservative standard therapy of venous leg ulcer. It accelerates the healing process.	↑↑	Strong consensus (100%)

Recommendation 17	Strength	Agreement
Prior to implementation of medical compression therapy, the relevant contraindications *shall* be excluded.	↑↑	Strong consensus (100%)

Contraindications of medical compression therapy (modified according to[31]):

- advanced PAD (if one of the following parameters is met: ABI < 0.5, arterial blood pressure at the ankle < 60 mmHg, toe pressure < 30 mmHg, or TcPO2 < 30 mmHg at the dorsal aspect of the foot),
- decompensated heart failure,
- phlegmasia cerulea dolens.

Recommendation 18	Strength	Agreement
In patients with venous leg ulcer and accompanying peripheral arterial disease with ankle-brachial index (ABI) above 0.5 or absolute arterial blood pressure at the ankle above 60 mmHg, compression therapy *should* be performed, if no other contraindications exist.	↑	Strong consensus (100%)

The dogma "no compression therapy in PAD" is no longer valid; a more differentiated approach is required in this situation.

Recommendation 19	Strength	Agreement
During selection of phlebological compression bandages, it *shall* be considered that several equivalent options are available: number of used bandages, application method including overlapping layers, and number of components (for example, long-stretch, short-stretch, and cohesive bandages).	↑↑	Strong consensus (100%)

Recommendation 20	Strength	Agreement
(A) In patients with VLU, phlebological compression bandages *should* remain in place for 24 hours. *(B)* In case of self-management, phlebological compression bandages *may* be removed during longer resting periods (for example, at night). They *should* be re-applied prior to new orthostatic stress.	↑ ↔ ↑	Strong consensus (100%)

Multi-component bandages may have benefits compared to conventional PCBs, for example, during application or in maintaining pressure.[32]

Recommendation 21	Strength	Agreement
During application of phlebological compression bandages, attention should be paid to adequate underpadding and upholstering to minimize the risk of pressure damage and skin injuries, while optimizing the contact pressure also in areas with anatomic depressions.	↑	Strong consensus (100%)

To avoid pressure damage and skin injuries while ensuring adequate contact pressure also on uneven anatomical structures, underpadding and upholstering are recommended for PCBs.[33]

Recommendation 22	Strength	Agreement
After the initial decongestion phase with multi-layer phlebological compression bandages, a switch to two-layer ulcer compression stocking systems *should* be performed in maintenance therapy of venous leg ulcer.	↑	Strong consensus (100%)

Since ulcer compression stocking systems are significantly thinner than PCBs, they cause less problems with shoe selection for the affected patients, which may improve the quality of life.[34]

Recommendation 23	Strength	Agreement
Medical adaptive compression systems *may* be used during both decongestion and maintenance phase of compression therapy of venous leg ulcer.	↔	Strong consensus (100%)

In Germany, medical adaptive compression systems (MAC), also known as "velcro compression wraps", have so far been used primarily in the decongestion phase as an alternative to PCBs. Especially in patients with VLU, however, the use of MAC may be continued in the maintenance phase. These compression systems provide the possibility to readjust the contact pressure via hook-and-loop fasteners or hooks and, in some systems, to set it specifically between 20–50 mmHg.[35]

Recommendation 24	Strength	Agreement
In patients with refractory venous leg ulcer, intermittent pneumatic compression *may* be applied in addition to medical compression therapy.	↔	Strong consensus (100%)

Recommendation 25	Strength	Agreement
In patients with venous leg ulcer unable to undergo continuous compression therapy, the following measures *shall* be performed after exclusion of contraindications: elevation of the legs, physical therapeutic interventions and/or gymnastic exercises in a lying position (active bed rest).	↑↑	Consensus (88.8%)

If continuous compression therapy is not possible, individually adjusted elevation of the legs, physical therapeutic interventions, and gymnastic exercises in a lying position (so-called active bed rest) may be used.[36]

Recommendation 26	Strength	Agreement
Patients with venous leg ulcer *shall* be informed that local pain will decline during compression therapy and should generally be lower than without compression therapy. An increase in pain during compression therapy *shall* be examined further.	↑↑	Strong consensus (100%)

In case of severe pain, initial use of compression therapy with low resting pressure of approximately 20 mmHg is recommended. In many patients, additional pain therapy according to the WHO pain ladder should be considered especially during the initial phase of ulcer treatment.[37]

Physical interventions

Recommendation 27	Strength	Agreement
Patients with venous leg ulcer *shall* be instructed to regular physical activity, for example, gait training and foot gymnastics, given that compression training achieves its full effect only after activation of muscle and joint pumps.	↑↑	Strong consensus (100%)

Regularly performed physical activity, if possible in the form of so-called vein sports, may improve the well-being of the patients, exert positive effects on their disease burden, and support healing in VLU.[38,39]

Recommendation 28	Strength	Agreement
In patients with venous leg ulcer with restricted mobility in the upper ankle joint (for example, arthrogenic congestion syndrome), mobilization *shall* be performed while continuing compression therapy.	↑↑	Strong consensus (100%)

Arthrogenic congestion syndrome is primarily caused by ankylosis of the upper ankle joint in talipes equinus position.[40]

Recommendation 29	Strength	Agreement
Patients with venous leg ulcer and clinically relevant lymphedema *shall* receive complex physical decongestive therapy after exclusion of contraindications.	↑↑	Strong consensus (100%)

Manual lymph drainage is an important pillar of the complex physical congestive therapy (CPC) in the treatment of lymphedema.[41]

Recommendation 30	Strength	Agreement
Given the infection risk of the wound, balneotherapy *should not* be performed in patients with active venous leg ulcer.	↑	Strong consensus (100%)

Invasive therapies

Invasive treatment options of VLU include the causal treatment of the underlying pathology with invasive interventions on the superficial or deep venous system and local invasive interventions on the ulcer itself.

Recommendation 31	Strength	Agreement
In patients with venous leg ulcer, surgical/ablative therapy of the underlying pathophysiology (for example, hemodynamically relevant reflux) in the superficial venous system *shall* be performed, if possible, at an early stage to achieve faster healing and a reduction of the recurrence risk while taking the risk-benefit ratio and the patient's wishes into account.	↑↑	Strong consensus (100%)

Apart from general and conservative measures, treatment of the etiologically relevant pathology in the superficial venous system represents the crucial causal therapy with the potential to improve the healing of VLU and reduce the recurrence risk.[42–44] Early intervention on the superficial venous system results in faster healing of VLU.[42,45]

Recommendation 32	Strength	Agreement
In active venous leg ulcer, treatment of the underlying insufficiency in the superficial venous system *shall* be performed despite a secondary deep vein insufficiency with reflux in the deep venous system.	↑↑	Strong consensus (100%)

It has been shown that the clinical symptoms improve after treatment of the superficial venous system even if concomitant refluxes in the deep venous system are already present. Accordingly, deep vein insufficiency should not be considered as contraindication for the treatment of truncal vein insufficiency.[42] The exclusion of a hemodynamically relevant, persistent occlusion of deep veins is, however, a fundamental prerequisite for the therapy of the underlying insufficiency in the superficial venous system.

Recommendation 33	Strength	Agreement
The decision as to which surgical/ablative procedure will be used for the treatment of the relevant causal pathophysiology in the superficial venous system *shall* be made together with the patient after risk-benefit assessment.	↑↑	Strong consensus (100%)

The invasive procedures include endovenous thermal and non-thermal techniques including sclerotherapy of the subulcer venous plexus and open surgical interventions.[46]

Recommendation 34	Strength	Agreement
In patients with venous leg ulcer and relevant peripheral artery disease, both pathophysiologies *shall* be treated according to the guidelines.	↑↑	Strong consensus (100%)

Recommendation 35	Strength	Agreement
In patients with venous leg ulcer and accompanying, hemodynamically irrelevant peripheral artery disease, surgical/ablative therapy of the underlying venous disease *should* be prioritized together with compression therapy.	↑	Strong consensus (100%)

In many patients currently classified as mixed leg ulcer (MLU), VLU presents with the comorbidity of PAD. For correct assessment, the accompanying PAD should be evaluated in a differentiated manner.[47] In patients with VLU and hemodynamically irrelevant or less relevant PAD, there are virtually no restrictions with respect to the selection of medical compression therapy and invasive therapy of CVI. The question of whether the focus should be placed primarily on the causal treatment of CVI or whether arterial revascularization is required initially must be clarified on an individual basis.[48]

Recommendation 36	Strength	Agreement
In patients with venous leg ulcer, invasive therapy of pelvic venous obstruction by means of recanalizing interventions (for example, angioplasty with stenting) *may* be considered, if there is a causal connection.	↔	Strong consensus (100%)

Recommendation 37	Strength	Agreement
The invasive therapy of pelvic venous obstructions *shall* always be performed in combination with medical compression therapy and only after all ulcer-relevant (invasive and non-invasive) therapeutic options of the superficial venous system have been exhausted.	↑↑	Strong consensus (100%)

Recommendation 38	Strength	Agreement
If invasive therapy of the underlying pelvic venous obstruction is indicated in individual patients with venous leg ulcer, the intervention *shall* be performed in a specialized center.	↑↑	Consensus (95.0%)

Before considering an invasive measure on the deep venous system, a minimum time interval of 6 months, preferably 12 months, should be allowed to elapse between the initial thrombotic event and the potentially beneficial effect of anticoagulation on venous recanalization and the functional aspects of the developing collateral circulations on the symptomatic venous obstruction.[49]

Invasive local interventions

Wound cleansing or debridement refers to the removal of avital tissue, crusts, or foreign bodies from wounds.[50] Various treatment options are available for the practical implementation.[50] Key objectives are avoidance and control of wound infection, improvement of wound assessment, and promotion of wound healing.[51]

Recommendation 39	Strength	Agreement
Loosely attached wound debris *shall* be removed mechanically during each dressing change.	↑↑	Consensus (95.0%)

Recommendation 40	Strength	Agreement
Firmly attached wound debris or necroses *shall* be removed to the edge of avital structures or into vital structures.	↑↑	Strong consensus (100%)

Recommendation 41	Strength	Agreement
Adequate analgesia *shall* be considered during removal of wound debris and/or necroses.	↑↑	Strong consensus (100%)

Often, topical application of local anesthetics is already sufficient for analgesia before performing wound cleansing or debridement. Especially in case of surgical debridement, other options, including general anesthesia, should also be discussed.

Recommendation 42	Strength	Agreement
In patients with venous leg ulcer, optimal therapy of the underlying pathophysiology *should* be completed prior to the implementation of skin replacement procedures.	↑	Consensus (95.0%)

Recommendation 43	Strength	Agreement
In patients with venous leg ulcer, autologous skin replacement procedures, such as split-thickness or full-thickness skin grafts, Reverdin graft, and, alternatively, allogeneic, xenogeneic, or biosynthetic skin substitutes *may* be used to accelerate wound healing.	↔	Strong consensus (100%)

Recommendation 44	Strength	Agreement
Autologous skin replacement procedures, such as split-thickness or full-thickness skin graft, Reverdin graft, as well as allogeneic, xenogeneic, or biosynthetic skin substitutes *shall* be applied to a well-prepared wound bed.	↑↑	Strong consensus (100%)

Allogeneic, xenogeneic, or biosynthetic skin substitutes present alternatives to autologous split-thickness skin grafts.[52,53] Other innovative procedures increasingly use (mesenchymal) stem cells or stroma cells within the framework of *tissue engineering* to promote wound healing in VLU.[54,55]

Recommendation 45	Strength	Agreement
Local negative-pressure wound therapy *may* be used for several days after split-thickness skin graft or Reverdin graft to improve the healing process.	↔	Strong consensus (100%)

Recommendation 46	Strength	Agreement
(A) In patients with refractory venous leg ulcer and lipodermatosclerosis, shave therapy *may* be performed. *(B)* During shave therapy, resection of peritendineum and exposure of periosteum *should* be avoided.	↔ ↑	Strong consensus (100%)

Recommendation 47	Strength	Agreement
Before the implementation of shave therapy of venous leg ulcer, both conservative and less invasive local interventions of wound treatment *shall* be exhausted and the underlying pathophysiology in the venous system *shall* be treated.	↑↑	Strong consensus (100%)

Recommendation 48	Strength	Agreement
Shave therapy *should* be performed in combination with concomitant defect repair. Wound bed preperation is not required for this treatment.	↑	Strong consensus (100%)

Shave therapy combines surgical wound debridement with tangential and controlled removal of any necroses and fibrotic or sclerotic ulcer portions beyond the wound edge until numerous capillary bleedings are achieved.[56] As a rule, the defect should be repaired during the same session, if possible.

Recommendation 49	Strength	Agreement
In refractory venous leg ulcer with pronounced lipodermatofasciosclerosis, fasciectomy *may* be performed in addition to shave therapy in individual cases.	↔	Strong consensus (100%)

During fasciectomy according to Hach, all necrotic tissue including the crural fascia are removed *en bloc*. This surgical form of therapy is a further escalation step after shave therapy and is useful in individual cases.[57] If the patient also presents with venous compartment syndrome, relevant relief is achieved by resection or incision of the muscular fascia.[58]

Prevention of recurrences

Recommendation 50	Strength	Agreement
After healing of venous leg ulcer, the affected patients *shall* be advised to wear medical compression stockings.	↑↑	Consensus (95.0%), Consensus without CI (93.3%)

Abbr.: CI, Conflict of Interest

Recommendation 51	Strength	Agreement
Medical compression stockings of at least compression class I and at least length A-D *shall* be used to prevent recurrence of venous leg ulcer taking medical indication and patient adherence into account.	↑↑	Strong consensus (100%)

Apart from the treatment of the underlying phlebological pathologies, continued medical compression therapy is the decisive aspect in preventing recurrences of VLU. For this purpose, MCS with at least stocking length to the knee (A-D) and compression class I should be prescribed. If possible, MCS should be worn consistently when the legs are not in an elevated position.

Recommendation 52	Strength	Agreement
In healed venous leg ulcer, insufficiency of the superficial venous system *shall* be treated by surgery/ablation to reduce the recurrence risk. This applies also to reflux in the deep venous system.	↑↑	Strong consensus (100%)

Recommendation 53	Strength	Agreement
In active or healed venous leg ulcer and relevant pelvic venous obstruction in the context of a post-thrombotic syndrome, recanalization interventions (for example, angioplasty with stenting) *may* be recommended to reduce the recurrence risk.	↔	Strong consensus (100%)

Recommendation 54	Strength	Agreement
In patients with healed venous leg ulcer, educational measures *shall* be implemented including information on clinical appearance and risk factors, as well as prevention strategies.	↑↑	Strong consensus (100%)

The positive effects of education on the healing of VLU have been demonstrated in several studies.[59] Education is a crucial instrument for improving patient adherence.[60]

Recommendation 55	Strength	Agreement
In healed venous leg ulcer, physical activity *shall* still be recommended to prevent recurrence.	↑↑	Consensus (95.0%)

Specific exercise therapy has a positive effect on wound healing rate and reduction of wound size of VLU.[61] In obese patients, weight normalization is also recommended, which may be supported by bariatric surgery, if appropriate.[62]

Recommendation 56	Strength	Agreement
In healed venous leg ulcer and obesity, weight normalization *shall* be recommended to prevent recurrence.	↑↑	Strong consensus (100%)

EVERYDAY CHALLENGES

Local wound therapy

Recommendation 57	Strength	Agreement
Patients with venous leg ulcers *shall* receive specifically tailored low-pain and indication-related wound care primarily targeting wound cleansing or debridement, balanced exudate management, and protection against microorganisms and foreign objects.	↑↑	Strong consensus (100%)

During the decongestion phase, dressings are used that can absorb a lot of exudate even under compression therapy and that have good retention, such as wound dressings with superabsorbers.[63] Dressings without adhesive surfaces or with skin-friendly coatings should be applied, if possible, to avoid unnecessary stress for the skin.[64,65]

Wound infections

Recommendation 58	Strength	Agreement
(A) In venous leg ulcer with clinical signs of local infection, wound debris and necroses *shall* be removed. *(B)* Subsequently, modern antiseptics, preferably based on octenidine or polyhexanide, *shall* be applied.	↑↑ ↑	Strong consensus (100%)

Recommendation 59	Strength	Agreement
The indication for the use of local antimicrobial wound therapy in venous leg ulcer with clinical signs of local infection *shall* be critically assessed at the latest after application for 14 days.	↑↑	Consensus (95.0%)

The *wounds-at-risk* (W.A.R.) score was developed to facilitate assessment of the individual risk of wound infections in patients.[66] The validated TILI (therapeutic index of local infections) score is suitable for the diagnosis of local wound infections.[67] While systemic infections require the administration of systemic antibiotics, local infections should be treated primarily with local antiseptics.[68] For most patients with VLU, polyhexanide (PHMB) is the wound antiseptic of choice.[69] Upon detection of multiresistant pathogens in the wounds, however, the use of octenidine and *2*-phenoxyethanol is recommended.[69]

Recommendation 60	Strength	Agreement
The administration of systemic antibiotics *shall* be employed primarily in systemic infections.	↑↑	Strong consensus (100%)

Wound surrounding

Recommendation 61	Strength	Agreement
Loose skin scales and crusts in the area surrounding the ulcer *should* be removed regularly in an atraumatic manner during dressing change.	↑	Strong consensus (100%)

In patients with VLU, bacterial infections, such as erysipelas, are more common than in the normal population.[70] Given that not only the wounds, but also minor skin injuries may provide points of entry for bacteria, skin scales and crusts in the area surrounding the wound should be removed in an atraumatic manner. This will facilitate inspection of the skin.

Medical skin care

Recommendation 62	Strength	Agreement
Individually adjusted skin care with hypoallergenic products *shall* be recommended in venous leg ulcer.	↑↑	Consensus (95.0%), Consensus without CI (93.7%)

Abbr.: CI, Conflict of Interest

Hydrophobic skin products can provide protection against moisture and maceration. Moisturizing factors, such as urea and glycerol, as well as lipophilic, lipid-containing ointment bases on a water-in-oil basis should be preferred for dry, itchy skin.[71] Regular skin care improves elasticity and integrity of the skin and reduces pruritus.[72]

Recommendation 63	Strength	Agreement
To prevent skin irritation, tubular cotton bandages *should* be applied under phlebological compression bandages with short-stretch bandages.	↑	Strong consensus (100%)

Recommendation 64	Strength	Agreement
The etiology of eczemas on the lower leg in venous leg ulcer *should* be determined.	↑	Consensus (94.4%)

Recommendation 65	Strength	Agreement
If allergic contact dermatitis due to a certain agent is suspected clinically, this agent *shall* be omitted initially.	↑↑	Strong consensus (100%)

Recommendation 66	Strength	Agreement
The allergologic identification of sensitization to skin care or wound products *should* be performed by patch testing with standardized substance series of the German Contact Allergy Group or, if these are not available, by direct application of the products.	↑	Consensus (94.4%)

Eczemas due to various causes are more common in patients with VLU. Apart from stasis dermatitis, these include asteatotic eczemas or allergic contact eczemas.[73] Given the increased prevalence of relevant contact sensitizations in patients with VLU, advanced diagnostics with patch testing and/or repeated open application test (ROAT) should be performed in case of suspicion.[74,75]

Patient education and self-management

Recommendation 67	Strength	Agreement
(A) Patients with venous leg ulcers *shall* be informed of the possibility of personally influencing the disease course and supported in implementation thereof in daily life.	↑↑	Strong consensus (100%)
(B) The content of the education *shall* be aligned to the individual needs, interests, and abilities of the patients, and the topics *shall* include at least the clinical appearance of chronic venous insufficiency, risk factors and risk reduction, management of self-care, skin cleansing and skin care, effect of compression therapy, selection of materials and their correct handling, physical activity, and weight normalization.	↑↑	
(C) Education of affected patients and, if appropriate, their relatives with respect to the management of venous leg ulcers *shall* be performed primarily in a personal discussion, as this promotes adherence.	↑↑	

Knowledge about their own disease and basic knowledge about the treatment, including the measures to be taken and the materials utilized for this purpose, enables patients with VLU to develop a better understanding of the therapy and thus promotes adherence.[76,77] Therefore, educating patients and, if appropriate, their relatives, is an essential task for everyone involved in the therapy.[78] Patients will then acquire the competence to evaluate therapies (*awareness*) and expertise (*empowerment*) while health-related self-management is supported.[79] The implementation of these aspects may then result in participatory decision-finding, with caregivers, physicians, affected patients, and relatives making joint decisions.[80]

The opportunity and willingness of the patients to act independently in connection with the disease and the involved measures is called *self-management* or *self-care*.[81] Self-management is, among other things, a crucial aspect in preventing ulcer recurrence, especially since the compression therapy with MCS is often performed independently.

Recommendation 68	Strength	Agreement
In case of problems with donning and doffing of medical compression stockings, suitable donning and doffing aids *should* be prescribed.	↑	Strong consensus (100%)

Donning and doffing aids for MCS often enable the independent handling of compression materials, resulting in improved adherence to the prescribed medical compression therapy and an improved quality of life of the patients.[82]

Recommendation 69	Strength	Agreement
In patients unable to don their medical compression stockings or phlebological compression bandages independently, it *should* be assessed whether this will be possible with medical adaptive compression systems.	↑	Strong consensus (100%)

Recommendation 70	Strength	Agreement
Additional telemedical care *should* be offered to patients with venous leg ulcers, if respective structures and financial models are available.	↑	Strong consensus (100%)

The increased need for medical care in combination with the lack of medical specialists is expected to result in an increased relevance of telemedicine in the future.[83] There is increasing scientific evidence suggesting that the complementary use of telemedicine improves the care as well as the healing rates of patients with VLU.[84] By increasing adherence, which may be further promoted by telemedicine, these programs have the potential to exert additional positive effects on the economic burden of VLU through faster healing and lower recurrence rates.[85]

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CONFLICT OF INTEREST STATEMENT

All relevant conflicts of interest of the authors are provided in the AWMF long version (https://www.awmf.org/).

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