



Review article

Patient-reported outcomes as diagnostic tools and clues in chronic wounds: Considerations for practice



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ARTICLE INFO

Article history:

Received 19 February 2015

Accepted 9 March 2015

Available online 27 March 2015

Keywords:

Health-related quality of life

Pain

Patient-reported outcome

Measurement

Chronic wound

Diagnostic

ABSTRACT

Background: Patient-reported outcomes (PROs) are essential components of wound diagnostics and management.

Objective: To provide an overview of PROs as diagnostic tools in management of chronic wounds.

Methods: Review of different concepts on inclusion of PROs in wound practice from literature.

Results: Patient-reported outcomes are indispensable fields of information for the understanding of the bio-psycho-social context of wound diseases. Some PROs are required for outcomes measurement, others for identifying patients at risk of comorbidity or disease escalation. An individual set of PRO is needed for the management of each patient. Essential dimensions to be recorded are pain, quality of life, patient burden of disease and the socio-economic status. Psychological parameters, adherence, treatment goals and benefits are often needed. Further fields of interest include Cumulative Life Course Impairment, coping with disease, stigmatisation and detailed psychosocial parameters.

Conclusion: Patient-reported outcomes are mandatory for the diagnostic work-up of chronic wounds. They also provide essential information in the course of disease, can be diagnostic clues for non-adherence and treatment failures and reflect patient orientation in treatment. Measurement of many PRO parameters in wound diseases, such as health-related quality of life and pain, is facilitated by validated instruments, which are recommended for practice.

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1. Introduction

The diagnostic process in chronic wounds is based on three columns: (a) a detailed analysis of the wound condition, (b) a careful investigation of patient history, underlying comorbidity and pathogenetic factors and (c) the understanding of patient burden and psychosocial parameters interrelating with the wound disease [1]. Each of these areas requires specific skills and – if available – evidence-based standards of evaluation and interpretation. Most of the information on (c) needs to be gained from the patient himself as “patient-reported outcomes” (PRO). This provides special challenges since these data will be subjective and more difficult to measure. Sometimes the reliability will not be as high as in objective measurements.

Nevertheless, the understanding of the patient’s personal situation, his life trajectories and perceptions with disease as well as his social and socio-economic situation are essential for the diagnostic process and the treatment plan. In particular, patient-relevant factors are crucial for implementing the therapies of choice, ensuring adherence with treatment, managing side effects and avoiding risks. In general, the patient-relevant benefits of interventions are considered as major criteria of success in medicine.

This article characterises the opportunities, techniques and limitations of using patient burden and psychosocial factors for diagnostic information in chronic wounds.

2. Diagnostic procedures in the course of wound care

The major categories of chronic wounds include leg ulcers, diabetic and ischaemic foot ulcers and pressure ulcers, all showing distinct clinical features and pathogenesis. The burden of disease for chronic wounds has been described in numerous publications. Recent consensus documents have underlined the need for a holistic view on patient care in chronic wounds [1,2].

Major challenges of chronic wounds are the stagnating wound condition as well as the pathogenetic factors resulting in tissue damage and ulceration. In most cases, these underlying diseases develop within months, years or even decades, thus preceding the wound disease. For this, cumulative burden for the patients derives both from negative impact of the non-healing wound and from the variety of comorbidity factors. In total, the result of both is in many cases a psychosocial and personal situation of strain. At any starting point of wound treatment, these cumulated factors need to be considered (Fig. 1). Furthermore, the current patient status with respect to health-related quality of life (HRQoL), psychological

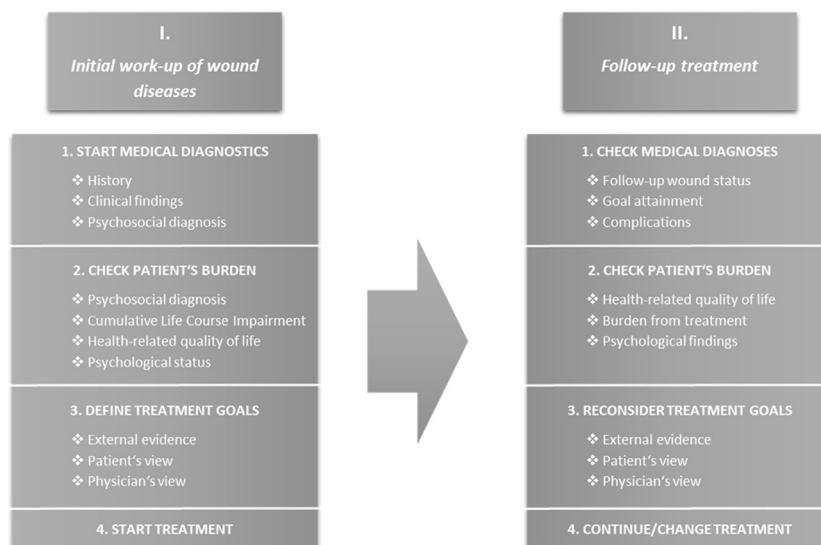


Fig. 1. Management of wound disease: diagnostic and therapeutic process including the patient view.

Table 1

Inclusion of PROs (marked bold) in the set of German quality indicators of guideline-compliant wound treatment practice in leg ulcers (German Delphi Panel, 2011 [3]). These 20 items indicate essential procedures for all or for specified (marked with an asterisk *) subgroups of wounds.

I. History	III. Treatment
1. Diligent history	11. Compression treatment in VLU*
2. History of pain	12. Vascular surgery, (if indicated*)
	13. Wound debridement
	14. Pain treatment, general
	15. Pain treatment at dressing
	16. Moist wound healing
	17. Antiseptics for infection*
II. Diagnostics	IV. Prevention
3. Accurate wound status	18. Aftercare
4. Wound size	19. Compliance
5. Pain level	20. Patient information
6. Vascular status	
7. ABPI	
8. Bacteriology	
9. Biopsies*	
10. Allergy diagnostics*	

factors and personal goals and needs is to be assessed. Along the course of treatment, the patient-reported outcomes need to be re-evaluated and any additional burden developing from the treatment itself needs to be identified. Thus, patient-reported information is needed throughout the treatment period for any wound and the measurement of PRO is a quality marker of wound health care [3].

3. The concept of measuring PROs for decision making in wound management

Any information, which is gained directly from the patient, is called “patient-reported”. “Patient-reported outcomes” (PRO) refers to parameters intentionally and systematically obtained from the patient. In wounds, they have always played a role, e.g. the assessment of pain. Nevertheless, the systematic concept of “patient-reported outcomes” has evolved in the past decades in medicine. Authorities like the Food and Drug Administration (FDA) have encouraged the medical and scientific community to include PROs in clinical research [4]. In wound treatment, PROs like quality of life are recommended by the European Wound Management Association (EWMA) consensus [5] and numerous outcomes tools have been developed [6–9]. Moreover, several assessments of PROs are included in the indicator sets for evaluating quality of health care [3] (Table 1).

3.1. Using patient-reported outcomes in medical decision making

In wound treatment, PROs are not just “nice-to-haves” but essential clues for clinical diagnostics (e.g. pain, discomfort) and for the assessment of overall severity. There are several types of PROs, which need to be considered (Table 2).

4. Diagnostic tools for patient’s symptoms

Major patient-reported symptoms to be recorded in the wound management process are pain, itch and any further discomfort resulting from the wounds, in particular bad smell, exudation and uncomfortable wound material. Though often occurring conjoint, they should be identified and evaluated in single assessments.

Pain is the most common and in the majority of patients also most disturbing negative sensation. The best method of pain assessment is the structured evaluation by single scores, in particular visual-analogue scales. There are three options: visual-analogue scales (VAS), numeric rating scales (NRS) and verbal rating scales (VRS), all being feasible and valid (Fig. 2).

4.1. Recommendations

Recommendations for diagnostic tools for patient’s symptoms

Pain	<ul style="list-style-type: none"> • Use pain scores at baseline and each follow-up. • VAS scores are sufficient, alternatively NRS or VRS • Keep standard definition of measurement on (a) reference: max./average pain, pain at rest/dressing change and (b) time frame (e.g. today, last 7 days)
Itch	<ul style="list-style-type: none"> • Consider measurement of itch if it has a relevant impact on the patient. • Use VAS according to pain.
Discomfort	<ul style="list-style-type: none"> • Ask open question on discomfort • If needed, ask for typical discomfort like stinging, bad odour • Consider using the Wound-QoL which includes these items.

5. Diagnostic tools for patient’s burden and quality of life

5.1. Recommendations

Recommendations for diagnostic tools for patient’s burden and quality of life

Quality of life	<ul style="list-style-type: none"> • Use disease-specific quality of life instrument; first choice: Wound-QoL • In wound practice check each single item for meaningful patient burden • Enforce implementation with WoundAct aid • Use global scale for overall assessment
Subjective disease burden	<ul style="list-style-type: none"> • Assessment of QoL mostly sufficient • Additional patient-centred questions as needed in practice
Cumulative life course impairment (CLCI)	<ul style="list-style-type: none"> • Check meaningful life impairment by open questions • If needed, apply specific instruments on defined areas of interest (single dimensions of CLCI)

5.2. Quality of life

Chronic ulcers induce relevant QoL impairments in the majority of patients [7,10–15]. This includes physical complaints like pain, exudation, burning skin, bad odour and reduced physical capacity. Psychological impairment is reflected by an elevated rate of depression, helplessness, anxiety and resignation. With respect to social area, the wound, the bandages, the smell, and many other factors can impair social contacts and mobility. Other activities such as cultural events, sports and leisure time may also be negatively affected. Most patients with chronic wounds are handicapped in doing daily routine activities or being able to work. In many cases, treatment by itself and the time needed for therapy is a burden. The impairments in many different dimensions of QoL lead to an overall loss of well-being as lined out in the European consensus paper on wellbeing in chronic wounds [16].

In a broad sense, QoL, as a multidimensional concept, encompasses at least some of the different factors listed above [17–19]. Additionally, it may prove useful to investigate the single predictors of QoL in chronic skin diseases [8]. For example, it has

Table 2

Areas and constructs of patient-reported outcomes used in clinical diagnostics for chronic wounds.

Area	Examples/Definition	Measurement	Importance
SYMPTOMS			
Pain	Max./Average pain, Pain at rest/dressing change	VAS NRS	++++
Itch	Max./Average itch, Itch at rest/dressing change	VAS NRS	++
Discomfort	Dysesthesia Bad smell Reduced mobility and movement	Single questions	++
DISEASE BURDEN AND QUALITY OF LIFE			
Quality of life	Generic QoL	EQ-5D-5L SF-36	++
	Disease-specific QoL	Wound-QoL FLQA-w CWIS, WWS	+++
Subjective disease burden	Overall burden	PGA	+
CLCI	Life trajectories resulting from wound disease	Interview	+
PSYCHOLOGICAL CONDITIONS			
Psychological status	Feeling depressed Feeling helpless Feeling lonely	HADS, BDI or single items	++
Perception of stigmatisation	Feeling stigmatised by outer appearance, bad smell, being handicapped or “different from others”	Single questions	++
Dysmorphophobia	Feeling of stigmatisation and negative appearance beyond “objective” perception from others	Specific questionnaire	+
Social support	Getting help with wound treatment Having social contacts	Single items	+++
Coping strategy	Active/Depressive coping	Single items; coping questionnaires, e.g. FQCI	+++
Risk behaviour	Patient reported behaviour aggravating disease; adverse behaviour regarding underlying disease (e.g. diabetes); adverse behaviour regarding therapy; non-adherence with treatment	Single questions	+++
Control attribution	Patient perception of disease causes Seeking for explanations	Questionnaires available	+
PATIENT'S VIEW ON TREATMENT PROCESS			
Patient needs and benefits	Patient needs in treatment Patient reported benefits	PNQ PBI	+++
Treatment goals	Patient perception on important personal goals from treatment	PNQ	+++
Treatment satisfaction	Satisfaction with treatment process Satisfaction with outcomes Satisfaction with goal achievement	PBQ, satisfaction instruments	+++
Treatment adherence	Compliance Adherence Concordance	Single questions	+++
SOCIO-ECONOMIC STATUS			
Socio- economic status	Level of financial support Lack of resources for treatment	Single questions	+
Employment	Working status	Interview	+

VAS: visual analogue scale, NRS: numeric rating scale, PGA: patient global assessment, SF-36: Short Form (36), FLQA-w: Freiburg Life Quality Assessment (wounds), CWIS: Cardiff Wound Impact Schedule, WWS: Würzburger Wundscore, HADS: Hospital Anxiety and Depression Scale, BDI: Beck Depression Inventory, FQCI: Freiburg Questionnaire of Coping with Illness, PNQ: Patient Needs Questionnaire, PBI: Patient Benefit Index, PBQ: Patient Benefit Questionnaire
+ rarely used, ++ sometimes used/if needed or; specific questions, +++ should be used in most wound conditions, ++++ absolutely necessary, no excuse when not applied

been specifically shown in chronic diseases that the time needed for treatment is a major predictor [9]. Moreover, social anxiety, negative coping, clinical severity and satisfaction with treatment have been found to be predictors of QoL [16,18].

Recommendation for practice: include QoL measurement and improvement in the management strategy of chronic wounds.

Ideally, in addition to clinical outcomes, valid measures of QoL should be used. Most recommended is the Wound-QoL, a very recently validated new QoL tool derived from previous instruments which is particularly feasible for routine care [20]. For implementation of the Wound-QoL into practice, a diagnostic aid called “WoundAct” is available. This summarises the striking areas

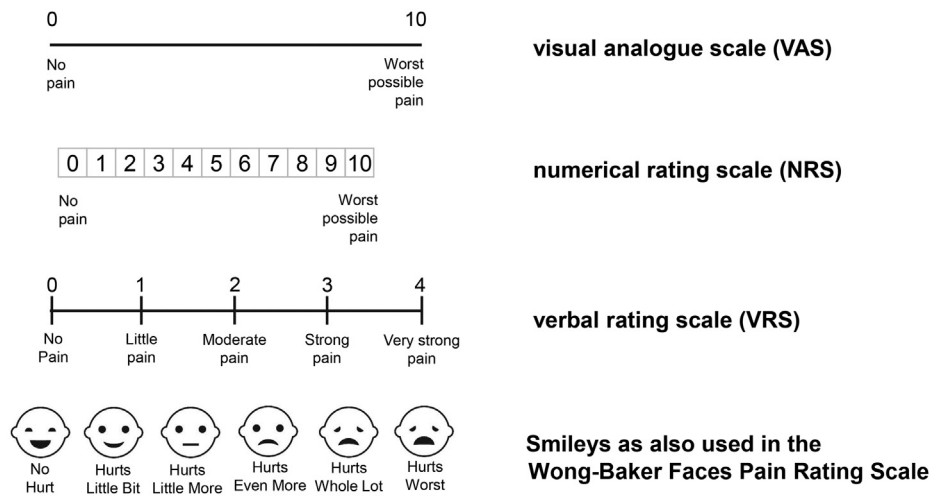


Fig. 2. Uni-dimensional scales for the assessment of pain (the original length of the VAS is 10 cm).

of QoL impairment and helps to check for improvements over the treatment period. Further QoL instruments specific for chronic wounds are the FLQA-w [11,12,21], the CIWS [9,22] and the WWS [23]. Moreover, patient needs and benefit instruments like the PBI [24] can also be routinely used for defining treatment goals in practice (see below).

5.3. Diagnostics of cumulative life course impairment

Cumulative life course impairment (CLCI) is a theoretical construct referring to the non-reversible burden of a chronic skin disease over time [25,26]. As such, CLCI can neither be directly measured nor can the patients' risk for CLCI be assessed by single screening scales. By contrast, patients at risk for CLCI need to be identified by clinical, personal and psychosocial indicators and predictors of CLCI, which need to be individually applied.

Chronic wounds of the skin are characterised by long periods of tissue loss and frustrating treatment. In a recent publication by Herberger et al. [21], the mean duration of community ulcers being referred to specialised centres was more than 3 years. These patients reported high levels of pain and frustration, suboptimum health care and in some cases even neglect. In general, ulcer disease severely interacts with the whole patient's life over months and years and in most cases is a lifelong issue.

In some patients and situations, this burden may lead to chronic impairment and missed opportunities and, finally, persisting psychosocial and personal damage. The importance of CLCI for patient with chronic wounds has been emphasised and recommendations for the identification of CLCI in the treatment process – despite of the absence of valid direct tools – were provided [27]. Areas of interest include the following:

1. Clinical disease severity
2. Chronic course of disease
3. Early onset of chronic wounds
4. Perception of stigmatisation
5. Lack of social support
6. Negative impact on profession
7. Negative mood
8. Coping strategy
9. Quality of life
10. Behaviours putting the patient at risk
11. Comorbidities

Each of these factors requires accurate assessment either by clinical considerations or by specific tools. Regardless of any single

objectifiable risk factor, personality and social support of the patient can markedly affect the extent of CLCI and thus modulate the risks.

5.4. Clinical aspects of CLCI identification in chronic wounds

Since CLCI is caused by the accumulation of strain, life events and changes in life course trajectories [27], the identification and prediction of these burdening factors may serve as a first step to assess CLCI risk factors. It is of further importance to realise that also personal factors including coping strategies do affect the impact on life course. Essential are the following dimensions of “single risks” [27]:

1. Clinical disease severity
Check for lifetime clinical severity and historical peak activity of wound and underlying pathology.
2. Chronic course of disease
Consider chronic course of disease as a *potential* CLCI factor.
3. Early onset of chronic wounds
Be specifically aware of CLCI factors in young chronic wounds patients.
4. Behaviours putting the patient at risk
Risk behaviour potentially inducing chronic wounds should be included in any screening for CLCI risks.

5.5. Comorbidities

Patients with chronic wounds need to be screened for comorbidity in the diagnostic process, both for understanding the overall medical condition as well as the impact of comorbidity on CLCI.

6. Diagnostic tools for psychological conditions

6.1. Recommendations

Recommendations for diagnostic tools for psychological conditions

Psychological status	<ul style="list-style-type: none"> • Check psychological conditions for depression and anxiety • Use 2-questions-test for screening • In case of need for data, a short test for psychological wellbeing may be useful, such as the HADS for the detection of anxiety and depression or the STAI for anxiety • Refer to specialist in case of unclear condition and/or persisting patient burden
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Perception of stigmatisation	<ul style="list-style-type: none"> • Clarify the extent of patient burden due to feelings of stigma in conversation
Dysmorphophobia	<ul style="list-style-type: none"> • Identify unrealistic perceptions of the patient outer appearance and the degree of stigmatisation • Refer to psychologist if there is patient burden
Social support	<ul style="list-style-type: none"> • Explore the level of social support, both in practical view and emotional • Consider the degree of social support and the patient's satisfaction with social relationships as a potential risk factor for worse wound healing.
Coping strategy	<ul style="list-style-type: none"> • Discuss the coping profile of the patient and her/his personal beliefs in healing, her/his fears and the way she/he deals with the chronic disorder. • Check also for personal resources and control attributions. • Try to identify the leading coping strategy; refer to specialist when a problem appears
Risk behaviour	<ul style="list-style-type: none"> • Check the patient's behaviour with respect to the underlying pathogenetic conditions of the wound • Refer to education if needed.

Chronic wound disease can be associated with a large variety of psychological disturbances. They occur reactively to the disease or as independent comorbidity. In particular, depression and anxiety disorders are common, show many facets and need to be diagnosed in a proper way – ideally by a specialist for psychological or psychiatric disease. For this, wound specialists should focus on screening for conditions suspicious of psychological morbidity rather than working out the diagnostic map of a psychological disorder.

For the diagnostic process in wound clinic, it is recommended to clarify the extent of psychosocial strain by interviewing the patient and to refer patients with any suspicion of psychological disease to a specialist. Nevertheless, the basic concepts of psychosocial assessments are worth to be known.

6.2. Psychological status

It needs to be noted that depression and anxiety are frequent in Western societies. Up to 20% of the normal adult population show features of depression and episodes of depressive diseases. Concomitant wound diseases may add to pre-existing psychological morbidity. Independent of comorbidity, for most patients, wound diseases also have a high emotional impact. Anger, depression, anxiety, grief, helplessness and loss of autonomy can frequently be found and should be included in the diagnostic process [24,28]. Likewise, positive emotions like optimism, trust, positive beliefs or joy and positive coping strategies can be raised and will be of help for the overall wound management process.

Complete diagnostic evaluation of psychological disorders is complex and prone to the experts. However, a first screening by the wound expert is helpful. For this, a few key questions have been shown to be equivalent in depression screening among patients with chronic diseases like pain-related disorders [29–31]. Though no specific screening studies have been conducted for chronic wounds, the following simple questions developed by Whooley et al. (1997) may be of use in the orientation for screening patients who then need to be referred to differentiated diagnostics [32]:

1. In the past month have you felt depressed, sad or without hope?
2. Have you experienced less motivation and joy to do things you otherwise liked to do?

For more profound diagnostics, the basic emotional conditions of anxiety and depression can be properly assessed with validated questionnaires such as the STAI (State-Trait Anxiety Inventory [33]) or the HADS (Hospital Anxiety and Depression Scale [2,16]).

Conclusion for practice: check patients' emotional status and the extent of "positive" thinking and coping.

6.3. Perception of stigmatisation

A second field of wound-related psychosocial problems can be stigmatisation, the patients' notion that others dislike and disgust him/her for outer appearance. The feeling of being stigmatised can be intensified when they are disturbing symptoms like bad smell or a generally bad physical conditions [13,34,35]. The feeling of stigma may occur at any age, at any time and for patients with different social and cultural backgrounds. Therefore, it should be addressed carefully and in the anamnesis. The feeling of stigma may be associated with the feeling of being a burden to others, especially to the nursing relatives. In both cases, a lack of self-esteem and self-consciousness may add. Overall, this situation requires identification by the healthcare professionals.

Conclusion for practice: try to understand if the patient has an increased burden due to perceived stigmatisation.

6.4. Dysmorphophobia (body dysmorphic disorder)

Contrarily to patients who feel stigmatised by obvious signs of disease, some patients show an exaggerated feeling that they have a negative outer appearance. A strikingly contrasting perception of the outlook between the health care professional and the patient may soon raise the suspicion. Even if not as frequent as in younger persons, even elderly may suffer from such a misperception and thus are in need of special help. Single questionnaires may help address the problem.

6.5. Social support

Due to their age, decreased mobility and sometimes disrupted family structures, a marked number of patients with chronic wounds may feel lonely and in lack of social support. Patients with chronic wound disease are thus especially vulnerable for social impairment and isolation [14,36]. Vice versa, the availability of supporting others may be a crucial factor to improve the psychosocial condition, quality of life, adherence with treatment and the overall treatment process. It is well known that diseases of any severity and duration can be better tolerated and coped with when there is social support from the part of the family, friends or caring others [15]. In chronic wound diseases, social support and social comfort are associated with better health-related quality of life [37]. Therefore, lack of social/family/partner support and social isolation should be a warning sign for the wound therapist. For this, knowledge about the extent and quality of social support is essential both before and along the treatment process. A first impression on this can be obtained by simple, colloquial questions. Moreover, short instruments for the evaluation of social support [38] have been developed, even if not routinely used in chronic wounds. They may add to an individual personal exploration. Moreover, some QoL instruments include scales for these areas.

6.6. Coping strategy

It is evident that patients with chronic wounds show very different patterns of reacting and coping with disease. Studies from

different fields of chronic diseases show that there is also a marked association between psychological burden and coping behaviour in chronic disease [39]. Active coping can improve the overall treatment outcome and stabilise the patient independent of the objective risk and degree of morbidity. Depressive coping and the feeling of helplessness and dependency on others may subsequently impair the healing process and thus need to actively be approached. The coping pattern is also associated with the adherence of patients and by these results in different treatment outcomes.

Patients with active coping are reported to feel “better” and perceive the disease in a less negative way. It is helpful to assess coping with a validated instrument such as the Freiburg questionnaire on coping with illness (FQCI) [40], which is derived from the Ways-of-Coping Checklist [41] or other country-specific coping tools [42].

6.7. Control and causal attribution

This term refers to the fact that patients have the desire to actively get into control of the disease and to understand what is happening. The notion of helplessness associated with external control attribution is a negative predictor of patient wellbeing. On the other hand, the knowledge about the disease as well as the absence of depression have been shown to predict better healing in venous leg ulcers [43].

In the light of large their variations between the individuals, it should thus be identified which personal models patients have concerning their disease and how they think control could be achieved. Moreover, unrealistic assumptions can be explored and – if possible – be corrected. If patients for example think that compression treatment of venous leg ulcers is devastating to them because tissue and blood flow may suffer, there is a need for correction concerning these misconceptions.

6.8. Risk behaviour

A great part of vascular and metabolic morbidity, which finally leads to chronic wounds is a result of chronic risk behaviour. Factors such as smoking, overweight and obesity, lack of exercise, stressful life and consumption of drugs can markedly increase the risk of vascular pathology, diabetes and consecutive ulcers. It is questionable how much space for improvement patients have once pathology has occurred. Nevertheless, risk behaviour for pathology should be identified and patients encouraged to change their lifestyle whenever possible. The impact of lifestyle factors and risk behaviour on the wound disease should be explored and conclusions for action drawn. It can also be relevant for the improvement of adherence to the wound specific treatment.

7. Diagnostic tools for patient needs and benefits

7.1. Recommendations

Recommendations for diagnostic tools for patient needs and benefits

Patient needs and benefits	<ul style="list-style-type: none"> • Identify the personal needs of the patient related to wound disease with direct questions. • Use the patient needs questionnaire (component of PBI) for a more structured approach if needed. • Check patient benefits from previous treatment for supporting the treatment decisions. • Measure achieved benefits from treatment for more efficient wound management (see treatment goals)
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Treatment goals	<ul style="list-style-type: none"> • Raise realistic treatment goals with the patient either in direct conversation or with Patient Benefit Index (PBI). • Always include time frames for goal attainment. • Check goal achievement along the treatment course.
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Treatment satisfaction	<ul style="list-style-type: none"> • Ask the patient about his satisfaction with treatment on a regular basis. • Just use simple questions in routine. • For further questions in research and quality assurance use standardised tools.
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Treatment adherence	<ul style="list-style-type: none"> • Adherence in most cases cannot be quantified in most cases. • Do not start extended investigations. Try to sensitively address the issue of treatment adherence. • Try to anticipate potential barriers proactively in direct conversation.
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7.2. Patient needs and benefits, treatment goals

In the diagnostic process for chronic wounds, it is essential to identify the patient needs for treatment, which give us clues for understanding and defining treatment goals and prioritise the most urgent measures. To do so, direct questions are feasible. Moreover, it can be of help to follow a standardised list of potential patient needs and goals as presented in the patient benefit index [6]. The first component, the patient needs questionnaire, includes such a standard list of items, which can be filled out by the patient at the beginning of treatment (patient needs questionnaire, Table 3).

Remarkably, patients with chronic wounds show individual patterns of needs and wishes which, however, are quite stable over time. Thus, a baseline assessment with a standardised questionnaire like the Patient Benefit Questionnaire (PBI) may be of long-lasting support for the wound management. Moreover, there initially defined needs and the preferred treatment goals can then be reflected at follow-up time points in the treatment phase. Predominantly for the purpose of research or quality assurance, a single patient benefit index can then be calculated based on the total sums of weighted single items.

This technique is called goal detainment scaling and just refers, in a structured way, to our basic thinking: first define goals and then check achievement.

Conclusion for practice: it is recommended to clarify patient needs before starting treatment, to define the goals of treatment and to check the completion of goals on a regular basis. The structured lists of the Patient Benefit Index system can be of help to follow a more structured approach.

7.3. Patient satisfaction

Efficient treatment of chronic wounds depends on the patient motivation to collaborate and to follow a common treatment schedule. The motivation for this also depends on the satisfaction with the therapeutic process. A lack of satisfaction indicates treatment failure, lack of explanation and patients' centrality or just a discrepancy between the patients and the physician's goals. Any of the reasons for patients' dissatisfaction are clues to underlying problems and their solutions. For this, treatment satisfaction can help us considerably in optimising the treatment. To do so, simple questions are sufficient and daily routine. For

Table 3

Patient needs from treatment in leg ulcers as measured by the Patient Needs Questionnaire [44] (top 12 from 25 needs shown; possible range: 0 = not important to 4 = very important).

Treatment need	Mean	SD	Quite/very important, %	Missing%
Be healed from the lesion(s)	3.93	0.38	98.80	0.00
Be free of pain	3.81	0.64	94.80	0.60
Be less dependent on doctor and clinic visits	3.78	0.49	97.10	0.60
Be able to lead a normal everyday life	3.74	0.67	93.00	1.70
Have confidence in the therapy	3.74	0.56	95.40	0.00
Have no discharge from the lesion	3.73	0.70	93.60	0.00
Not have an unpleasant smell from the lesion	3.59	1.02	90.10	0.00
Have no fear that the disease will become worse	3.57	0.89	87.80	2.30
Find a clear diagnosis and therapy	3.54	0.92	86.10	1.70
Experience a greater enjoyment of life	3.50	0.90	85.50	2.90
Need less time for daily treatment	3.49	0.90	87.20	0.60
Be more productive in everyday life	3.44	0.95	84.30	0.60

quality management, clinical research or just further going questions and practice, a systematic assessment with questionnaires can be useful. In particular, it needs to be considered that patient satisfaction is a direct reflection of the healthcare givers and thus may be biased by social decidedness and patients fear to direct his complaints to the healthcare providers. For this, an indirect, postal survey may be more visible whenever critical views are of interest.

7.4. Treatment adherence

Adherence refers to the degree a patient follows the treatment decision with the doctor or the nurse. Unlike compliance which relates to just following the doctor's/nurse's recommendation, adherence is based on a process of participation and collaboration between patient and health carer. In the following section, the term "adherence" is used in order to express the goal of a collaborative treatment process. However, the content also counts for "compliance" Adherence with treatment is one of the major predictors of treatment success in all wound conditions. It is thus of great importance to gain information on the level of adherence from the patient. However, there is no direct measure and obviously there are some barriers to evaluate and interpret the patient adherence with treatment. Some clues of patient adherence derive from the wound status, such as persistent ankle oedema and the absence of compression marks on the skin in case of compression treatment for venous leg ulcers.

Generally, intentional and unintentional non-adherence is differentiated. Intentional non-adherence includes the decision of the patient to not use the therapy for specific reasons. Unintentional non-adherence (and -compliance) refers to mistakes in application or non-use of the treatment by error. Unintentional non-adherence will be easier to record if only asked for. By contrast, identifying intentional non-adherence requires a high degree of trust and personal relationship between the patient and the health caregiver. Only in very few cases, there will be objective parameters such as drug levels in medication or unredeemed prescriptions. In a pragmatic approach, the patient in practice will be asked about his chances to use the treatment as agreed rather than directly interrogated for non-adherence. Even more important, potential hurdles for adherence should be clarified in the process since most patients feel more comfortable to talk about barriers than the real rate of adherence.

Conclusion for practice: adherence in most cases cannot be quantified. Do not start extended investigations. Try to sensitively address the issue of treatment adherence and anticipate potential barriers in direct talk.

8. Socio-economic status

8.1. Recommendations

Recommendations for diagnostic tools for patient needs and benefits

Socio-economic status	<ul style="list-style-type: none"> Consider the patient's educational status in order to assess the potential of understanding information and education. Clarify the patient's ability to co-pay wound treatments.
Profession and employment	<ul style="list-style-type: none"> Find out whether the patient's professional opportunities are impaired due to the chronic wound. Identify occupational factors, which impair wound healing.

Chronic ulcers of the skin are a great economic burden to both the payers and society [45]. However, there is also a financial challenge to many patients themselves [46,47]. In most countries, only a part of the expenses for ulcers is covered by the payers. Moreover, losses of earnings and time for the patients and their relatives are an economic burden. There is also a considerable burden due to travel costs and time for visits to care. In total, the costs for a patient with leg ulcers have been rated at about € 8000 per patient and year, involving roughly € 6000 for the payers, € 1200 for the patients and € 800 for the society (indirect costs) [46], thus emphasising the economic impact of disease.

8.2. Socio-economic status

The socio-economic status of patients with chronic wounds needs to be known to the wound manager for at least two reasons:

- (1) It has been shown that the social status interacts with the development and course of wound disease (higher risk in lower social classes). Thus, a low economic status may impair healing chances of chronic wounds [21].
- (2) In some countries, out-of-pocket expenses derive from co-payment and the purchase of wound dressing material and over-the-counter drugs. Some patients may not be able to afford the spending needed for proper wound treatment.

For this, the capacity and the willingness of patients to financially contribute for wound therapy needs to be explored. Doing so, the social status related to education and training is a

second field of information, which relates to the patient's capacity of understanding disease, necessities of treatment and prevention as well as discussing limitations of adherence. Many of these facets will be explored in direct conversation with the patient.

8.3. Impact on profession and occupation

Apart from the social support, the impact of chronic wounds on the profession and the fact that they represent potential barriers in professional life can be crucial. This includes the potential lack of proper education and proper training: it is well known – albeit not completely explained – that patients with chronic wounds show lower school education or social levels when compared to healthy persons [21,47]. Moreover, the number of missed days at work is significantly elevated compared to age-adjusted healthy controls [37]. Both can reduce chances of reaching a satisfying socio-economic status. Vice versa, occupational factors like continuous standing in an upright position may add to the causal effects of underlying disease or even directly interfere with treatment. Thus, a direct short verbal assessment of profession or leisure activities is recommended.

Funding sources

None.

Conflict of interest

None.

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