When pressure gets under the skin

Pressure ulcers – Development. Diagnosis. Management.

Contents

Pressure ulcers
A challenge for medical and nursing care.

Pressure ulcers – also known as pressure sores, decubitus ulcers, bedsores – is one of the most-feared complications in patients requiring nursing care. This includes inpatient and acute care in clinical settings, long-term care in care facilities or outpatient care in the home environment. Pressure ulcers are associated with significantly poorer health and a lower quality of life.

For that reason, effective prevention and appropriate treatment in all healthcare settings are crucially important.

Did you know...?
The plural form of decubitus is also decubitus. It is pronounced dih-kyoo-bi-tuhs.[1]

"A pressure ulcer is localised injury to the skin and/or underlying tissue, usually over a bony prominence, as a result of pressure, or pressure in combination with shear. There are a number of additional factors which are associated with pressure ulcers, or are suspected to be, the significance of which is not yet known."[2]

Definition of pressure ulcer based on the international definition of NPUAP, EPUAP and PPPIA (2014)*

*NPUAP = National Pressure Ulcer Advisory Panel / EPUAP = European Pressure Ulcer Advisory Panel / PPPIA = Pan Pacific Pressure Injury Alliance.

Preventing pressure ulcers
Providing better healthcare.

Epidemiology
In its 2018 Nursing Care report, the Scientific Institute of the German insurance provider AOK (WIdO) calculated key figures on nursing care and healthcare in nursing homes. A significant finding was that there were 8.5 new cases of pressure ulcers on average for every 100 nursing home residents every year![3] Experts all agree that "(...) expert nursing care can largely prevent the development of pressure ulcers. However, it should be acknowledged that this goal may not be achievable for all patients/residents."[4]

Prevalence in acute and long-term care settings
Pressure ulcers are common in all healthcare settings: currently in Germany, the prevalence of pressure ulcers in acute and long-term care settings is approximately 2-4%.[5] Based on future demographic shifts, with an increasing percentage of elderly and multimorbid people in the population, it must be assumed that the number of patients affected by pressure ulcers will also rise in the coming years.

Focus on prevention
In view of the increasing number of pressure ulcer cases, there is an increasing focus on pressure ulcer prevention. Current guidelines and expert standards, which provide recommendations for patient-centred care based on science, stay abreast of this development. The "Expert Standard for Pressure Ulcer Prevention in Nursing, second update 2017"[1] from the Deutsches Netzwerk für Qualitätsentwicklung in der Pflege (DNQP) (German Network for Quality Development in Nursing) is relevant for Germany in terms of social security law. The implementation of the standard is seen as the shared responsibility of all stakeholders involved – from management to nursing staff. According to the current standard, preventative actions, which contribute to pressure relief and distribution as well as promotion of movement, are paramount.

How pressure ulcers develop
A multifactorial phenomenon.

For a long time, it was assumed that pressure applied for a certain period of time was one of the primary causes of pressure ulcers. The development of pressure ulcers is now viewed in a more differentiated way and based on a complex causal model, which reflects the work of various expert commissions in recent years.

In addition to pressure and time, shear and tensile forces in particular play a crucial role in the development of pressure ulcers, but the microclimate, including factors such as temperature, perspiration, incontinence, and so on, should also be considered. Only friction, in terms of superficial skin injury, is now considered less important. Additionally, more focus has been placed on individual risk factors, such as age, dehydration and medication intake.

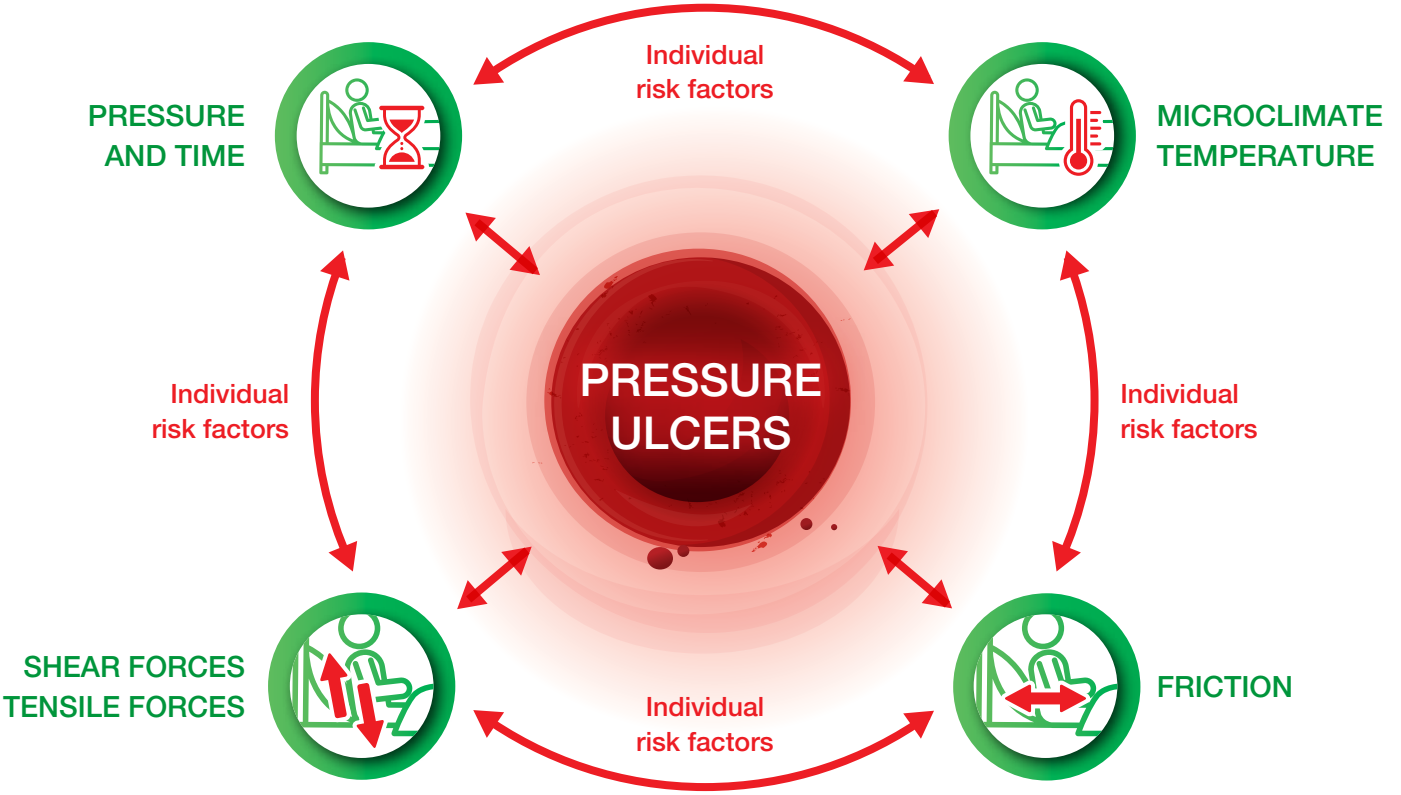
According to the expert standard, the following three individual patient characteristics are the most important casual factors for the risk of developing pressure ulcers:[6]

1. **Limited mobility**
2. **Circulation problems**
3. **Already compromised skin condition or pre-existing pressure ulcers**

Based on an analysis of the various guidelines, the expert standard summarises the most important risk factors for the development of pressure ulcers as follows:[7]

- poor nutritional status
- reduced activity and mobility
- increased skin moisture levels
- comorbidities (e.g. diabetes mellitus)
- reduced sensory perception
- demographic variables such as age, gender and ethnicity
- blood circulation and oxygen supply to the skin
- existing pressure ulcers

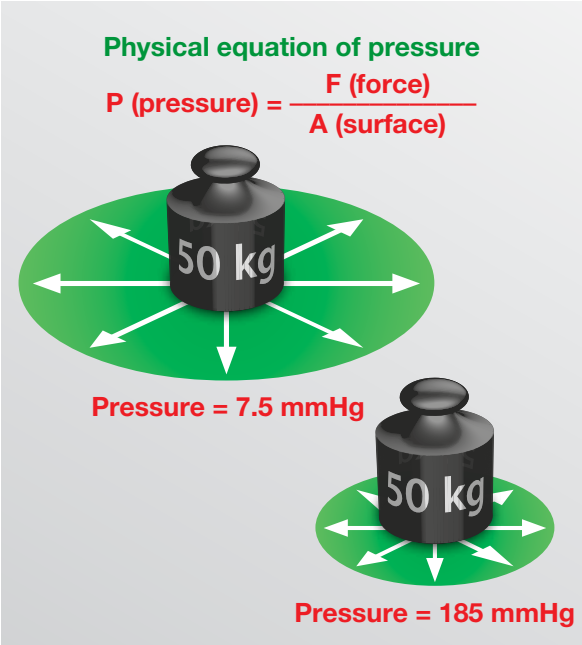
Many factors. One indication.

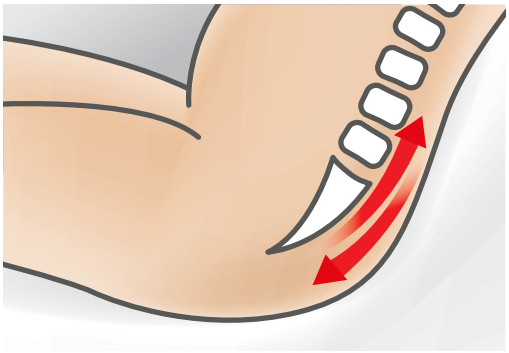


Pressure and time

Pressure and time – or more specifically, the amount and duration of pressure – continue to be important factors for the pathophysiology of pressure ulcers. It is only when a certain amount of pressure is applied to a patient at risk of pressure ulcers over a certain period of time that injury to the skin can occur. This is dependent on the pressure applied to the skin, the person's sensitivity to pressure, that is, tissue tolerance to pressure and oxygen as well as the other patient-specific risk factors. So, the same amount of pressure for the same period of time may cause a pressure ulcer in one patient, but not in another patient.

- pressure is a force that acts perpendicular to a surface
- the smaller the surface onto which the pressure is applied, the greater the pressure and vice versa
- the interface pressure is directly proportionate to the person's body weight, meaning that the heavier the body weight, the greater the pressure





Shear forces

The origin of the vascular supply to the skin is in the subcutaneous fat. Blood vessels can be easily stretched, twisted and displaced in this displaceable layer. If a patient is lying in a half-sitting position in bed, for example, i.e. at an inclined angle, the deeper layers of tissue (predominantly muscles) slide downwards due to gravity, while the skin remains in the same position. This results in shearing and tissue damage!

Fig.: In an experiment, a displacement of the skin of up to 2 cm was observed.

Skin damage due to pressure and shear forces

While pressure acts perpendicular to the tissue, shear forces act parallel to the tissue. The perpendicular-acting force can compress the blood vessels when sustained pressure is exerted, which can lead to decreased blood supply to the affected sites.

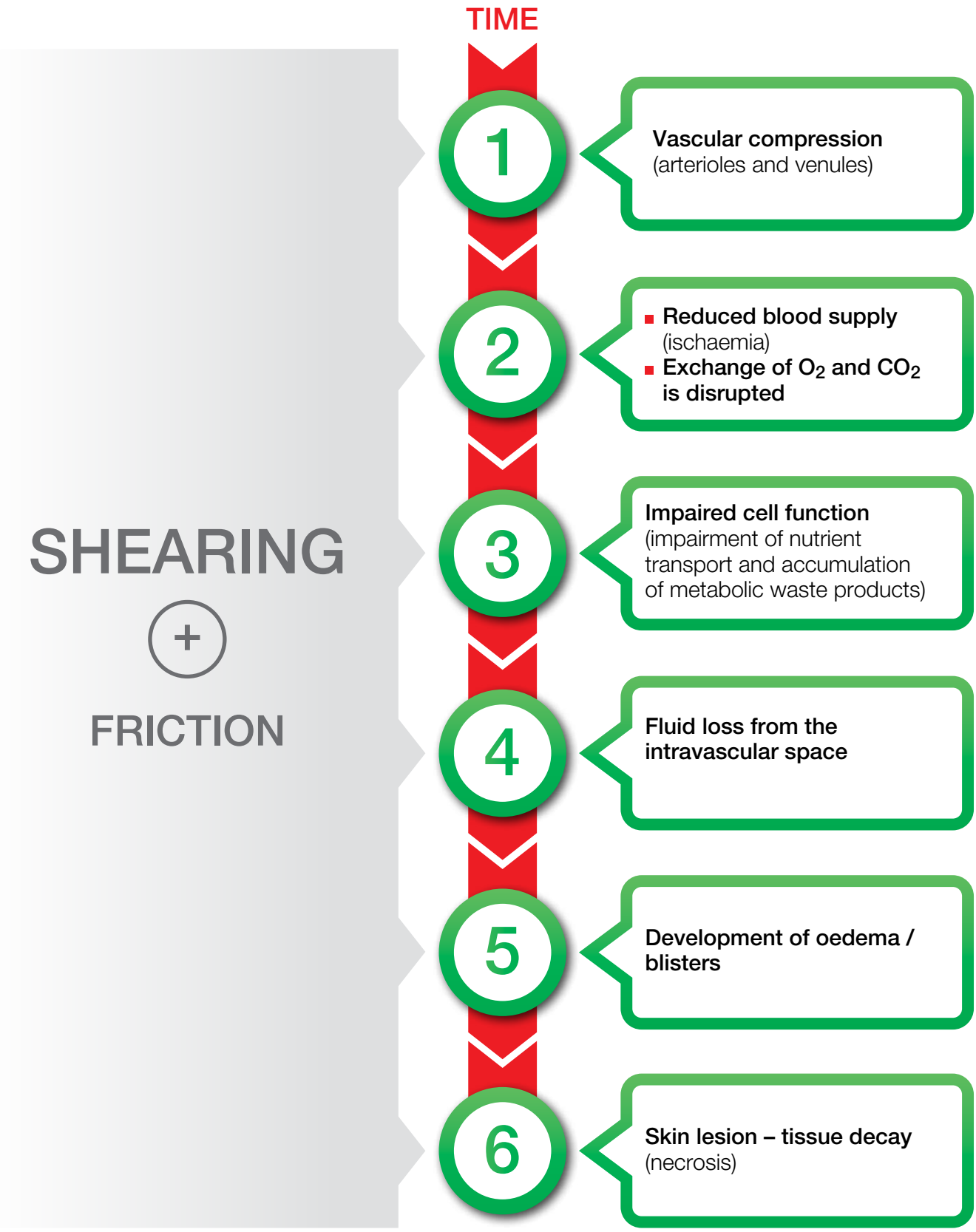
This disrupts the supply of oxygen and nutrients to the tissue and the removal of carbon dioxide and metabolites. If the compressing pressure, and associated lack of oxygen, continue, tissue damage occurs and a pressure ulcer develops. Two types of pressure can be differentiated in this process:[8]

- **external,** for example, from the mattress, folds in bed sheets, unpadded positioning splints, crumbs in the bed, shoes, but even catheters and probes if they apply pressure to the skin
- **internal,** for example, from bones, which are directly beneath the skin without padding from muscle and fat

The displacement between the layers of tissue caused by shear leads to a stretching or tearing of the blood vessels in the subcutaneous tissue. The result: The skin is no longer supplied with enough blood and cells can die.

How pressure ulcers develop
A multifactorial phenomenon.

The result of sustained pressure:



In addition to the duration and intensity of the pressure and shear forces, tissue tolerance has an effect on the risk of pressure ulcers.

Pressure ulcer or not a pressure ulcer – tissue tolerance is the deciding factor.

The standard textbook “PflegeHeute” [“NursingToday”] defines tissue tolerance as “the skin and subcutaneous fat’s ability to withstand pressure without harmful effects.”[9] Thus, “tissue tolerance” describes the factors that influence a person’s risk of pressure ulcers without being directly associated with the duration and intensity of pressure and shear forces.

Tissue tolerance for pressure:[10]

- **Tissue mass:** Well-developed subcutaneous fat and muscles can disperse pressure better than thin layers over bony prominences or “atrophic” muscle layers in paralysed patients
- **As we age,** our ability to disperse pressure declines. This is due to, among other things, changes in the structure of the connective tissue, the reduction in muscle tone and slower regeneration of skin cells
- **Dehydration:** Insufficient fluid intake reduces the skin’s elasticity
- **Glucocorticoid therapy:** Taking glucocorticoids for an extended period inhibits the production of collagen and the regeneration of capillary vessels
- **Protein and vitamin C deficiency:** Vitamin C plays a large role in collagen formation; a protein deficiency exacerbates the effect of glucocorticoids
- **Stress:** Cortisol production is likely to be increased in stressed people, which in turn slows the production of collagen

Tissue tolerance for oxygen:[10]

- **Fever:** Perspiring leads to dehydration and to a greater need for oxygen in the tissues
- **Temperature:** High room temperatures and overly warm clothes or bed linen increase metabolism and thus the need for oxygen in the tissues
- **Beta blockers** reduce skin circulation by 20-30%
- **Protein deficiency** leads to oedema, which in turn reduces the supply of oxygen to the skin
- **Nicotine dependence** promotes arteriosclerosis, which is associated with reduced blood flow and a reduced supply of oxygen to the skin
- **Diseases,** for example, lung diseases, anaemia and diabetes mellitus, lead to, among other things, a reduced supply of oxygen and vascular changes
- **Blood pressure:** Systolic blood pressures below 100 mmHg and diastolic pressures below 60 mmHg can increase the risk of pressure ulcers

Where pressure ulcers occur and predilection areas

Areas at risk of pressure ulcers.

The parts of the body that are primarily affected by pressure ulcers are those where prominent bones lie just beneath the skin, and are not sufficiently padded by subcutaneous tissue or muscles. The convex structures on these body parts play a crucial role in the development of pressure ulcers.

With convex contours, the surface of the bone is smaller than the associated area of skin.

The body parts are always those where the skeletal system directly adjoins the surface and there is no subcutaneous tissue and muscles to distribute the pressure.

Wasting and osteoporosis as exacerbating factors

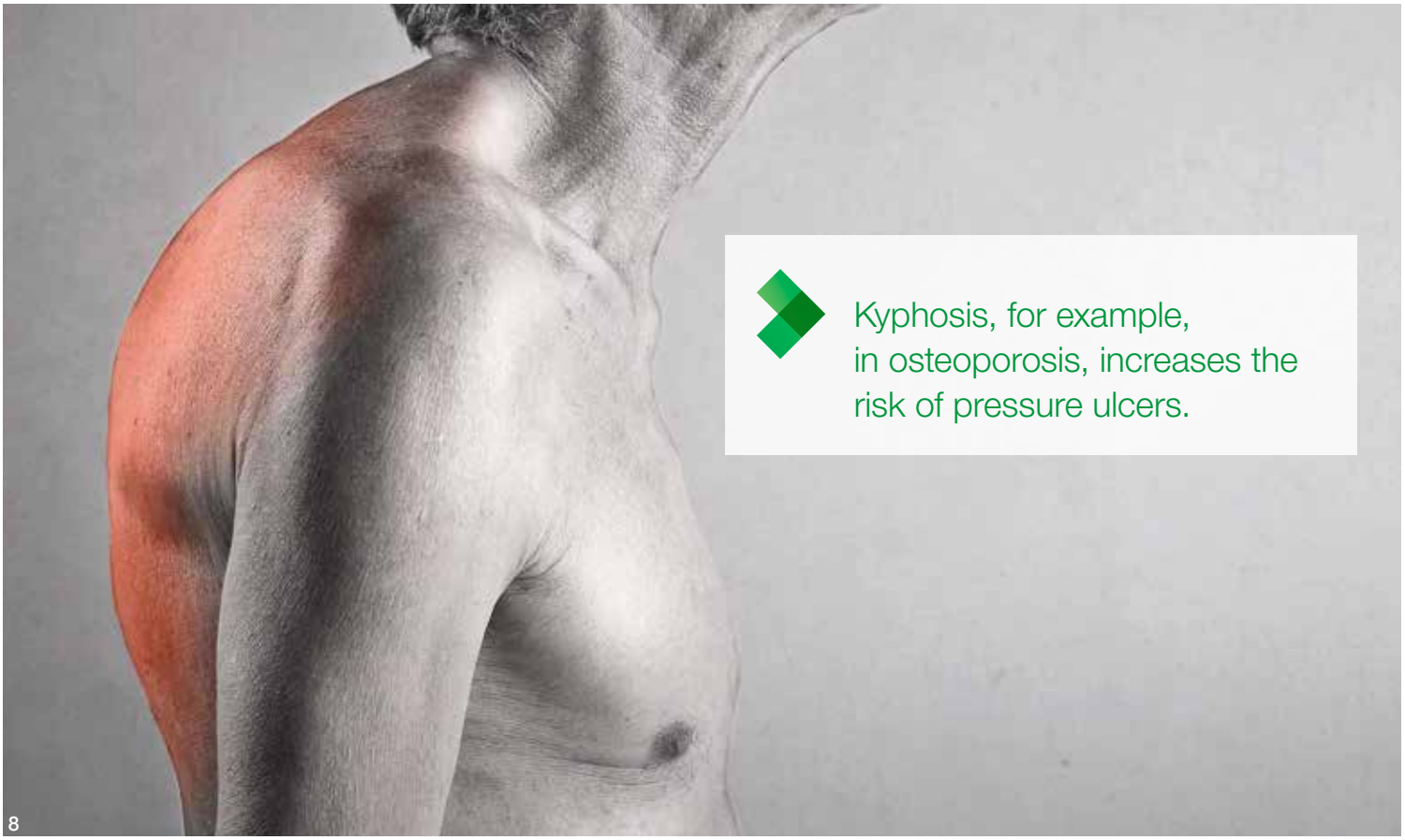
If a patient suffers from wasting disease (severe emaciation) with a reduction of the subcutaneous tissue, their body contours becomes increasingly convex, which increases the risk of pressure ulcers.

It is similar for patients with osteoporosis, as this also promotes the development of convex body contours. For example, if a kyphosis, commonly known as “hunchback”, develops in the course of the osteoporosis disease, the protruding spinous processes and the “rib hump” form convex contours, which are especially at risk of pressure ulcers.

It is all about positioning

Which other body parts are also particularly at risk depends on the position of the patient. “PflegeHeute” lists the following predilection sites for each position:[11]

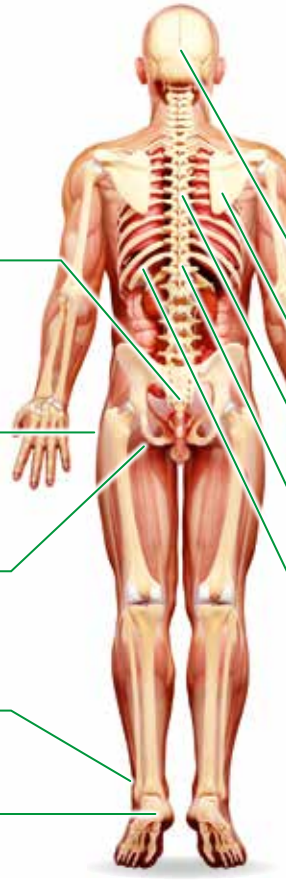
- **lying on back:** sacrum, coccyx, heels, shoulders, back of the head, spine and elbows
- **lying on side:** ears, greater trochanter, knees, elbows, ankles
- **lying on stomach:** forehead, elbow, pelvic bones, ribs, kneecaps, toes
- **sitting:** heels, ball of foot, back of head, ischial tuberosity, spine, back of thigh



Kyphosis, for example, in osteoporosis, increases the risk of pressure ulcers.

Primarily affected body parts (predilection sites)

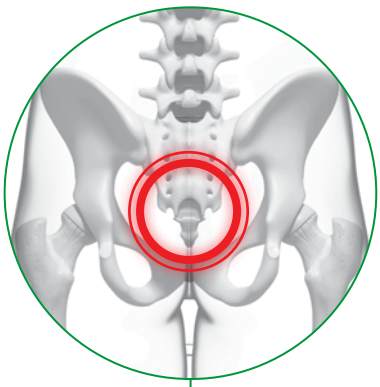
- **sacrum, coccyx** (*Os sacrum, Crista sacralis mediana ossis, Os coccygis*)
- **greater trochanter** (*Trochanter major femoris*)
- **ischial tuberosity** (*Tuber ossis ischii*)
- **lateral and medial malleolus** (*Malleolus lateralis, Malleolus medialis*)
- **heel** (*Calcaneus*)



Secondarily affected body parts

- **back of the head** (*Regio occipitalis*)
- **shoulder blades** (*Scapulae*)
- **thoracic spine** (*Pars thoracica*)
- **spinous processes** (*Processus spinosi*)
- **ribs** (*Costae*)

More than half of all pressure ulcers are found:

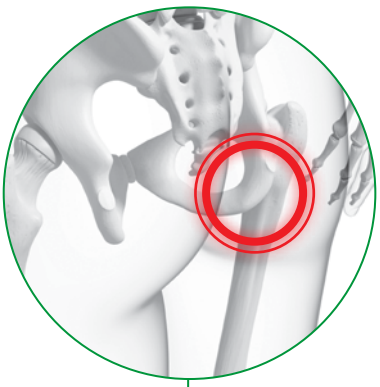


A

in the sacral region, which is the most heavily strained as it bears the body's weight

B

on the heels



C

in the area around the ischial tuberosities

Pressure ulcer classifications and categories
Guidelines and terminology.

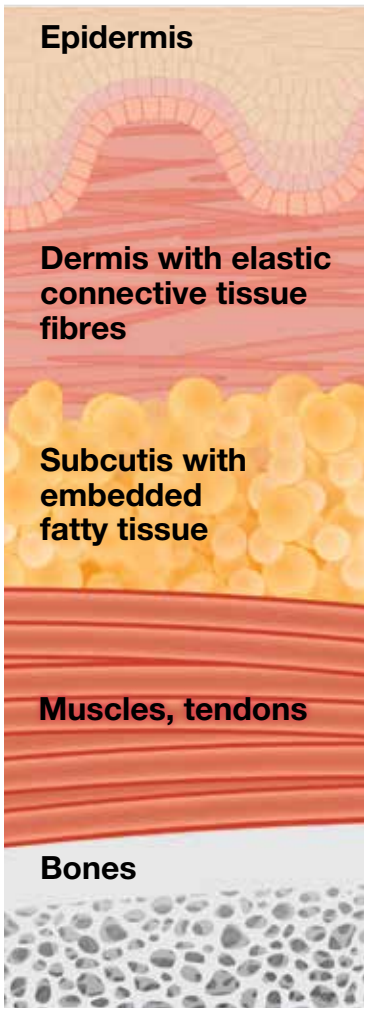
In 2019, the third edition of the international pressure ulcer guidelines, "Prevention and Treatment of Pressure Ulcers" was published. It was developed in co-operation between the partner organisations the European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Injury Advisory Panel (NPIAP) and Pan Pacific Pressure Injury Alliance (PPPIA).[12] Fourteen wound care organisations from 12 countries also participated in the project as associated organisations.

Pressure ulcer classification systems according to the guideline

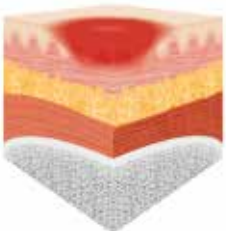
The 2019 EPUAP/NPIAP/PPPIA guideline recommends that users employ a classification system for pressure ulcers to document the degree of tissue damage.[13] The severity of a pressure ulcer is determined by how deep it extends into the tissue. Pressure ulceration is generally divided into four stages or categories. The abridged version of the guideline refers to three common international classification systems:[14]

- INTERNATIONAL NPUAP/EPUAP PRESSURE ULCER CLASSIFICATION SYSTEM (2009, 2014)
- WHO ICD-11 (2018)
- NPUAP CLASSIFICATION SYSTEM (APRIL 2016)

Pressure ulceration categories according to the Pressure Ulcer Advisory Panel (EPUAP 2019).
Categories that can be coded in ICD-10.



Category I: Non-blanchable erythema



Category II: Partial-thickness skin loss

Category III: Full-thickness skin loss

Category IV: Full-thickness tissue loss

Category, stage or grade?

The biggest difference in the classification systems lies in the definition and terminology used to describe tissue loss in the respective tissue layers with pressure ulcers. NPUAP/EPUAP adopt the term “category” in their guideline “…because the terms for pressure ulcer classification previously used, “stages” or “grades” or “severity” assume a progression from I to II, III or IV”[15], which is, however, not always the case. The advantage of the “category” terminology is that it does not imply a progression and, therefore, does not suggest that a wound develops from “I to IV” and heals from “IV to I”.

Although “category” is considered the most up-to-date term, the WHO continues to use the term “grade” for pressure ulcer classification. In the NPUAP 2016 guideline, however, pressure ulceration is classified according to “stages”.

ICD-10 versus ICD-11

Pressure ulceration classification according to ICD-10-GM is in accordance with the “official classification for coding diagnoses in outpatient and inpatient care settings in Germany”[5] and is used for medical billing. However, the ICD-10 coding currently does not capture the category “Further tissue damage” as described by EPUAP. This will, however, be possible in the future when the WHO’s ICD-11 classification is introduced. The new classification is set to come into effect in Germany on 1 January 2022 with a transitional period of five years.[16]

Intact skin with non-blanchable redness of a localised area usually over a bony prominence. Darkly pigmented skin may not have visible blanching, but its colour may differ from the surrounding area. The area may be more tender, firmer, softer, warmer or cooler compared to adjacent tissue. Category/stage I may be difficult to detect in individuals with dark skin tones. May indicate “at risk” individuals (sign of potential risk).

Partial-thickness loss of skin (down to the dermis layer) presenting as a shallow, open ulcer with a red-to-pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister. Presents as a shiny or dry shallow ulcer without slough or bruising.* This category/stage should not be used to describe skin tears, medical adhesive-related burns, perineal dermatitis, maceration or excoriation.

Full-thickness tissue loss. Subcutaneous fat may be visible, but bone, tendon or muscle is not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunnelling. The depth of a category/stage III pressure ulcer varies by anatomical site. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and category/stage III ulcers can be shallow there. In contrast, areas of significant adiposity can develop extremely deep category/stage III pressure ulcers. Bone/tendon is not visible or directly palpable.

Full-thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. May include undermining and tunnelling. The depth of a category/stage IV pressure ulcer varies by anatomical site. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and these ulcers can be shallow. Category/stage IV ulcers can extend into muscle and/or supporting structures (e.g. fascia, tendons or joint capsules), causing osteomyelitis. Exposed bone/tendon is visible or directly palpable.

* Livid discolouration indicates deep tissue damage.

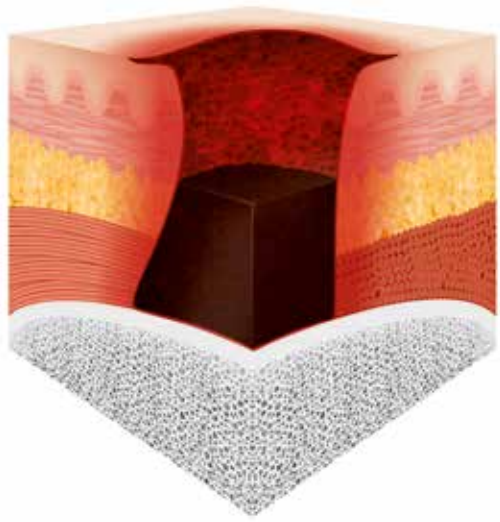
Pressure ulcer classifications and categories
Guidelines and terminology.

Other tissue damage – no code in ICD-10

The EPUAP 2014 guideline for pressure ulcer prevention added two additional classifications to the categories, which can now also be found in the updated 2017 expert standard. The pressure ulcer classifications relate to tissue damage which can develop as a result of deep pressure: this can either be classified as "Unstageable: depth unknown" or "Suspected deep tissue injury: depth unknown."[17] In the English full version of the EPUAP guideline, there are two additional classifications for the development of pressure ulcers due to pressure on the surface.[18]

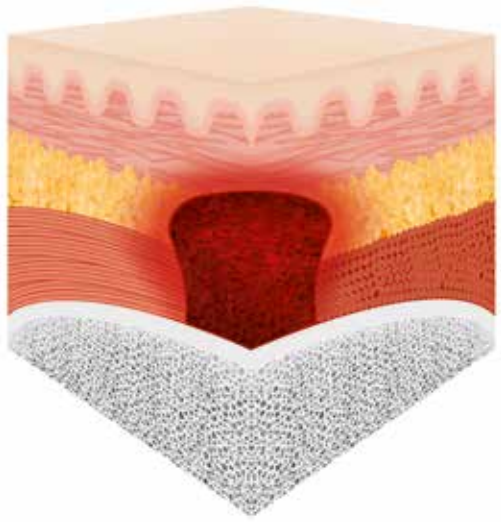
1. Deep pressure

A. Unstageable: depth unknown



Full-thickness tissue loss in which the base of the ulcer is covered by slough (yellow, light brown, grey, green or brown) and/or eschar in the wound bed. Until enough slough and/or eschar is removed to expose the base of the wound, the true depth, and therefore category/stage, cannot be determined. Stable (dry, adherent, intact without erythema or fluctuance) eschar on the heels serves as 'the body's natural (biological) cover' and should not be removed.

B. Suspected deep tissue damage: depth unknown



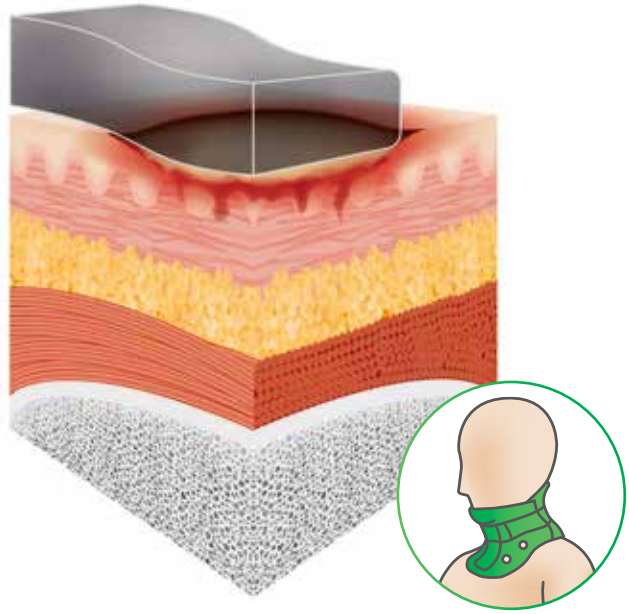
Purple or maroon localised area of discoloured intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, form, mushy, boggy, warmer or cooler as compared to adjacent tissue. Deep tissue injury may be difficult to detect in individuals with dark skin tones. Evolution may include a thin blister over a dark wound bed. The wound may further evolve and become covered by thin eschar. Evolution may be rapid, exposing additional layers of tissue even with optimal treatment.

The classification systems for pressure ulcers allow nursing staff to better document the severity of tissue loss.

2. Pressure on the surface

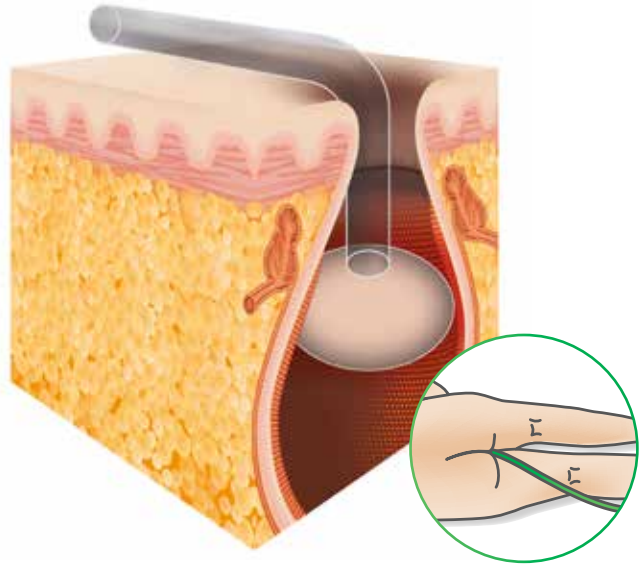
(English full version, European Pressure Ulcer Advisory Panel 2019)[18]

A. Device-related* pressure injuries



Device-related pressure injuries result from the use of medical devices, equipment, furniture and everyday objects, which have exerted pressure on the skin, either as an unintended consequence of their therapeutic use or inadvertently from unintentional contact between the skin and device. If the pressure injury developed due to a device, which is designed and used for diagnostic or therapeutic purposes, it is referred to as a device-related pressure injury. The resulting pressure injury generally takes on the pattern or shape of the device. The term “device-related” describes the aetiology of the pressure injury and not the severity or extent of tissue loss. Device-related pressure injuries should be classified according to a recognised classification system like other pressure injuries.

B. Pressure injury to the mucous membranes



Pressure injuries to mucous membranes are the result of pressure to moist mucous membranes that line the airways, gastrointestinal tract and urogenital tract. Pressure injuries to mucous membranes are primarily caused by medical devices (generally tubes and retention materials) applying sustained pressure and/or shear forces to the mucous membrane. Pressure injuries in the mucous membrane of the respiratory tract (lips, mouth, nasal passages, etc.) are typically caused by artificial respiration or feeding tubes and/or their retention devices. Pressure injuries to the gastrointestinal tract and urogenital tract (penis, ureter, etc.) are predominantly caused by feeding tubes or stomas and catheters.

*Referring to medical devices.

Risk assessment and pressure ulcer prevention

Identifying and preventing individual risks.

The 2017 expert standard identifies pressure ulcer prevention as a core responsibility in nursing.[19] An individual risk assessment is first required in order for targeted preventative actions to be taken. Nursing staff are therefore required to perform an assessment of the risk of pressure ulcers when a patient is admitted. Follow-up assessments should be based on the level of individual risk or changes to pressure and mobility.

The clinical assessment by a nurse is used to determine the individual risk of pressure ulcers. Observing and collecting information forms a comprehensive picture of the risk factors, taking the patient's overall health status into consideration. Circumstances which prolong and/or increase the impact of pressure and shear forces, such as limitations on mobility, play a key role. If the risk of pressure ulcers cannot be initially ruled out upon initial contact after taking down the patient's medical history, a more in-depth risk assessment is carried out based on a detailed analysis of the individual risk factors and skin inspection.[11]

Individual risk factors[20]

- limited mobility and activity (paralyses, sedation, depression, pain, relieving postures, diseases, etc.)
- reduced sensation and/or consciousness (polyneuropathy, e.g. in diabetes mellitus, paralyses, narcosis, etc.)
- medical devices and applications in direct contact with skin/mucous membrane (catheter, cannulas, tubes, dressings, anti-thrombosis stockings, retention devices close to the body, etc.)
- existing or healed pressure ulcers
- being underweight
- age

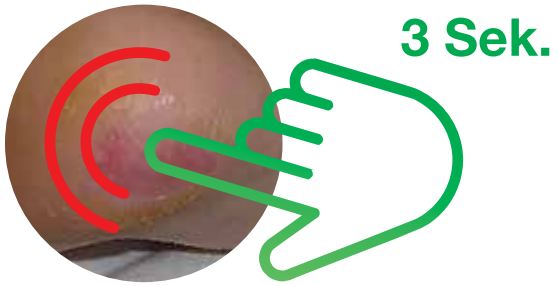
Risk scales for pressure ulcer assessment

There are various scales for assessing the risk of pressure ulcers. The most well known are the modified Norton Scale and modified Braden Scale. However, the "Expertenstandard Dekubitusprophylaxe in der Pflege, 2010" (Expert Standard for Pressure Ulcer Prevention in Nursing, 2010), which has already been revised, no longer gives a general recommendation for the use of risk scales, as their clinical benefit in practice could not be verified. However, the standard acknowledges that scales may make less experienced nursing staff aware of the risks.[21]

Skin inspection for risk assessment

When performing the skin inspection, focus in particular on the predilection sites for pressure ulcers, such as convex structures over bony prominences. If there is erythema on these areas or others, perform the finger test to determine whether it is temporary or persistent erythema, which is already a pressure ulcer.

The finger test:
The finger test allows permanent erythema to be distinguished from temporary erythema.



- press in the middle of the erythema with your fingertip for three seconds
- if the skin remains red after releasing your finger and does **not** turn white, the patient has a Category I pressure ulcer
- the reddened skin may also be more tender, warmer or colder, firm or soft compared to the adjacent skin areas

› **The clinical skin inspection is a critical part of the risk assessment and it contributes significantly to the determination of any further measures are required. For example, if a category 1 pressure ulcer is found, measures must be taken immediately to relieve and distribute pressure to counter the risk of it progressing to a higher category pressure ulcer.**

"Pressure ulcers are associated with significantly poorer health and a lower quality of life, which is why strong preventative actions are required to prevent them."

Preamble to the "Expert Standard for Pressure Ulcer Prevention in Care Settings," second update 2017

Expert Standard for Pressure Ulcer Prevention in Nursing

Since it was first published in the year 2000, and since the 2010 and 2017 updates, the "Expert Standard for Pressure Ulcer Prevention in Nursing," which was published by the DNQP, has guided the actions of nursing professionals in the healthcare system in the prevention of pressure ulcers. In accordance with the German Social Code XI (SGB XI section 113a) and the Pflege-Weiterbildungsgesetz (Further Training in Nursing Act), the expert standards have been legally binding since July 2008. According to general case law, they are understood to be anticipated expert judgments. Thus, they are mandatory for nursing staff who provide medical/therapeutic care, provided that the patient has consented to pressure ulcer prevention.

With regard to guideline-based prevention, the focus is on interventions which contribute to relief and distribution of pressure. As in the previous version, in the current expert standard the promotion of movement is also considered of prime importance.

Definition of pressure ulcer prevention:[11]
Measures to prevent pressure ulcers. Pressure relief and distribution on at-risk body parts have top priority.

Pressure ulcer prevention versus treatment

Pressure ulcer prevention must be distinguished from pressure ulcer treatment, which is strictly only performed by doctors. Within the meaning of "preventative defence against dangers" pursuant to sections 276, 278 of the German Civil Code (BGB), nursing staff independently plan and carry out pressure ulcer prevention, without instruction from a doctor. When a pressure ulcer occurs and treatment starts, doctors and nurses provide care and treatment for the pressure ulcer collaboratively, performing different tasks. The doctor is responsible for giving instructions on wound treatment. They usually delegate this to nursing staff who are trained in modern wound care.

Measures for the prevention of pressure ulcers

Pressure relief for at-risk body parts and pressure distribution are central to the measures for the prevention of pressure ulcers. The effectiveness of the preventative measures is checked by a thorough skin inspection, which is conducted at intervals set on a case-by-case basis according to the intervals specified in the risk assessment.

Overview of pressure relief and distribution measures:[22]

- encourage patient to move independently
- positioning and repositioning
- complete relief of body parts at high risk ("pressure-free positioning")
- avoid or reduce treatment-related impact of pressure and shear forces

Successful prevention of pressure ulcers requires suitable training to ensure both the continued application of the measures and participation of patients and family members.

*Referring to medical devices.

Pressure ulcer treatment
Pressure relief. Positioning.

In addition to a detailed wound assessment and classification, comprehensive treatment of pressure ulcers includes local treatment with wound cleansing and care measures and causal treatment, among other things, with measures for complete pressure relief, nutrition and pain management.

Pressure relief and distribution measures

Pressure relief and distribution have the highest priority in pressure ulcer prevention as well as in treatment. Particularly for existing pressure ulcers, the crucial factor is consistent complete pressure relief through regular repositioning and appropriate aids. This is because pressure ulcers can only heal when they are not exposed to any pressure. Pressure relief is essential for restoring blood circulation and the supply of oxygen to the damaged skin area; in other words, it is fundamental for the wound healing process.

It is all about positioning

The importance of the repositioning in the treatment and prevention of pressure ulcers is also echoed, among other places, in the specific instructions of the current abridged version of the EPUAP 2019 guideline: Position changes should be carried out for all people with pressure ulcers or a risk of pressure ulcers based on an individual schedule, provided that this is not contraindicated.[23] Starting with a two-hour interval is generally recommended. This is shortened or extended depending on the effect.[22]

› Regardless of the repositioning intervals, the following applies to positioning in all cases:

- allow the largest possible body surface area to be supported, as increasing the contact surface reduces pressure
- use support aids as little as possible, and as much as necessary!
- pressure creates counter pressure, therefore, do not use hard support aids or hard objects

- the softer the support surface (mattress, pillow), the worse the body awareness
- aids (anti-pressure ulcer mattresses, etc.) do not replace regular repositioning of the patient
- positioning aids only work if there is a small amount of material between the mattress and patient
- avoid placing the patient in supine position or sitting position with legs outstretched or only briefly for therapeutic purposes

Pressure relief of the sacral region – the 30° tilt position

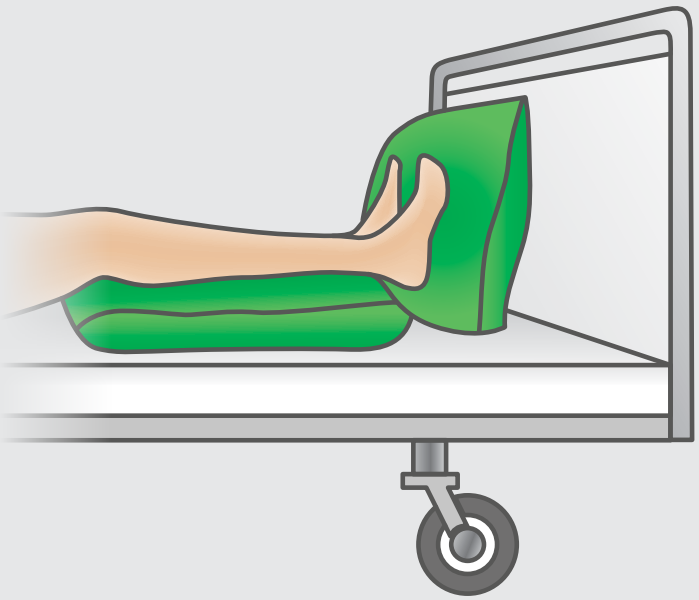
The support position used mostly commonly in practice is the 30° tilt position. It provides pressure relief to the sacral region!

Indication:

- pressure relief of the sacrum (sacral region)
- pressure relief of the greater trochanter (*Trochanter major femoris*)
- pressure relief of the shoulder blade
- pressure relief of the elbow

› Important when positioning:

- check the body axes, i.e. shoulder girdle and pelvis must be parallel
- do not rotate the hips more than the shoulders
- if necessary, place heels in a pressure-free position
- a bed rail may promote the patient's feeling of safety (discuss with the patient)
- the head end does not need to be flat (beneficial for patient with shortness of breath)
- if the 30° angle is exceeded too much and the patient is turned 45° to 60°, the patient often turns onto their back again after a short time



Pressure relief of the sacral, back and heel regions – the 135° position

The 135° position is the physiological “resting position”, which is similar to the position many people sleep in. It provides relief and relaxation and is the optimal position for existing pressure ulcers.

Indication:

- complete pressure relief of the sacrum (sacral region)
- complete pressure relief of the spine and its spinous processes
- complete pressure relief of the heels

› **Important when positioning:**

- the position is correct if there is no pressure on the lower greater trochanter (*Trochanter major femoris*)
- check the skin of the iliac crest, knee and elbow joints
- suitable position for wound care and dressing change in the sacral region
- suitable position for wound inspection and positioning of wound therapeutics

› **Caution:** People with heart problems and/or shortness of breath generally do not tolerate this position due to the pressure on the chest. Disorientated and anxious patients rarely tolerate this position. Immobile patient more commonly experience a fear of “sinking”.

Complete pressure relief of the heels – the pressure-free heel position

“The heels should be put in a completely pressure-free position (relieved) so that the weight of the leg is distributed through the calf without placing all of the pressure on the Achilles tendon. The knee should be slightly bent.”*

› **Important when positioning:**

- the knee must not be left unsupported
- the upper ankle joint must rest on a sufficiently large cushion
- hyperextension of the knee can lead to pain and obstruction (narrowing) of the popliteal vein (Vena poplitea), which can promote deep vein thrombosis

› **Caution:** when placing the heel in the pressure-free position, use wide supports to ensure that increased pressure or shear forces are not applied to other areas, for example, the calves and sacral region!

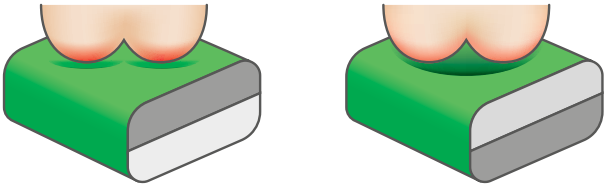
*National Pressure Ulcer Advisory Panel and European Pressure Ulcer Advisory Panel.

Pressure ulcer treatment
Aids. Wound care. Documentation.

Aids to support repositioning can be used in the prevention and treatment of pressure ulcers. They must be selected individually for each patient based on, among other things, the priorities of the care and treatment goals, the patient's ability to move independently, their weight and the at-risk or affected body parts.

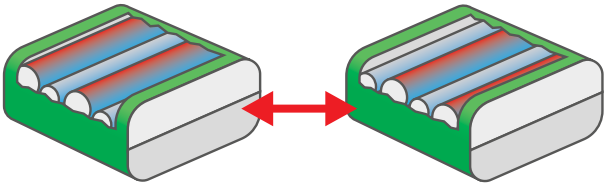
Pressure relief and distribution aids

Aids such as alternating-pressure mattresses, special support systems, foam underlays, soft foam mattresses, made-to-measure positioning cushions and special beds ensure the greatest possible interface surface for better pressure distribution. They are used when pressure relief through promotion of movement and repositioning is insufficient.



Hard mattress
Pressure at certain points

Soft mattress
Pressure is distributed



Alternating-pressure mattress
Alternating pressure application and relief

The updated 2017 expert standard gives the following recommendations for aids:[24]

- soft foam mattresses should be favoured over standard mattresses
- alternating-pressure mattresses can be used as an alternative to soft foam mattresses if it is not possible to reposition the patient frequently due to their health status
- paraplegic patients should have a pressure-relieving seat pad at all times

› **Caution:** Soft and super soft foam mattresses are not suitable for patients who are still able to move independently and for whom the promotion of movement is a priority. They can restrict movement and inhibit the patient's spontaneous movements.[22]

Unsuitable pressure relief aids

- ⊗ fleeces (sheepskin or synthetic fleece)
- ⊗ shearling slippers
- ⊗ absorbent cotton dressings
- ⊗ water pillows
- ⊗ foam ring cushions, ring seat cushions
- ⊗ foam mattresses with cutout in the buttocks area
- ⊗ air or water-filled positioning ring cushions

Preventative skin care and skin protection

The NPUAP/EPUAP/PPPIA guideline (2019) recommends keeping patients' skin clean and appropriately moisturised and cleansing the skin after each incontinence episode. The use of alkaline soaps and cleansers is to be avoided when cleansing the skin. Protecting the skin from excessive moisture with a barrier product and high absorbency incontinence products is also recommended. Silicone foam dressings are also recommended to protect the skin of people at risk of pressure ulcers.

Caution: Skin care routines that do more harm than good[25]

- ⊗ ointments and creams that seal the skin's pores and do not allow the skin to breathe, e.g. Vaseline, zinc paste, bag balm ointment
- ⊗ icing and hair dryers increase the risk of infection because hairdryer blows germs onto the skin, and can result in burns from ice or heat
- ⊗ Using rubbing alcohol: it does not improve blood flow to the skin. In fact, alcohol degreases the skin and makes it less resistant to pressure
- ⊗ essential oils (e.g. pine needle oil) and hyperaemic skin care products and massage devices cannot permanently increase the blood flow to the skin
- ⊗ Prophylactic use of disinfectants: skin disinfectants and antiseptics destroy the skin microbiota as well as pathogenic germs
- ⊗ non-breathable rubber and plastic bed underlays and incontinence materials prevent the skin from managing optimal moisture levels itself

Wound care for pressure ulcers

Pressure ulcer care is based on the principles of modern wound care and, among other things, the wound stage, depth and level of exudation. The EPUAP 2019 guideline summarises the criteria that need to be considered when selecting a suitable wound dressing as follows:[26]

- diameter, shape and depth of the pressure ulcers
- assessment of the bioburden
- ability to keep the wound bed moist
- type and amount of wound exudate
- condition of the tissue in the wound bed
- condition of the skin surrounding the wound
- presence of tunnels and wound cavities
- pain

If indicated by the clinical condition, the guideline (EPUAP 2019) recommends:[27]

- hydrocolloid dressings for non-infected category II pressure ulcers
- hydrogel dressings for non-infected category II pressure ulcers
- hydrogel dressings for non-infected category III and IV pressure ulcers with minimal exudate
- polymer dressings for non-infected category II pressure ulcers
- calcium alginate dressings for category III and IV pressure ulcers with moderate exudate
- foam dressings and hydropolymers for category II and higher pressure ulcers with moderate/heavy exudate
- super-absorbent dressings for heavily exuding pressure ulcers
- moist gauze dressings when advanced wound dressings are not an option

Infection and biofilms

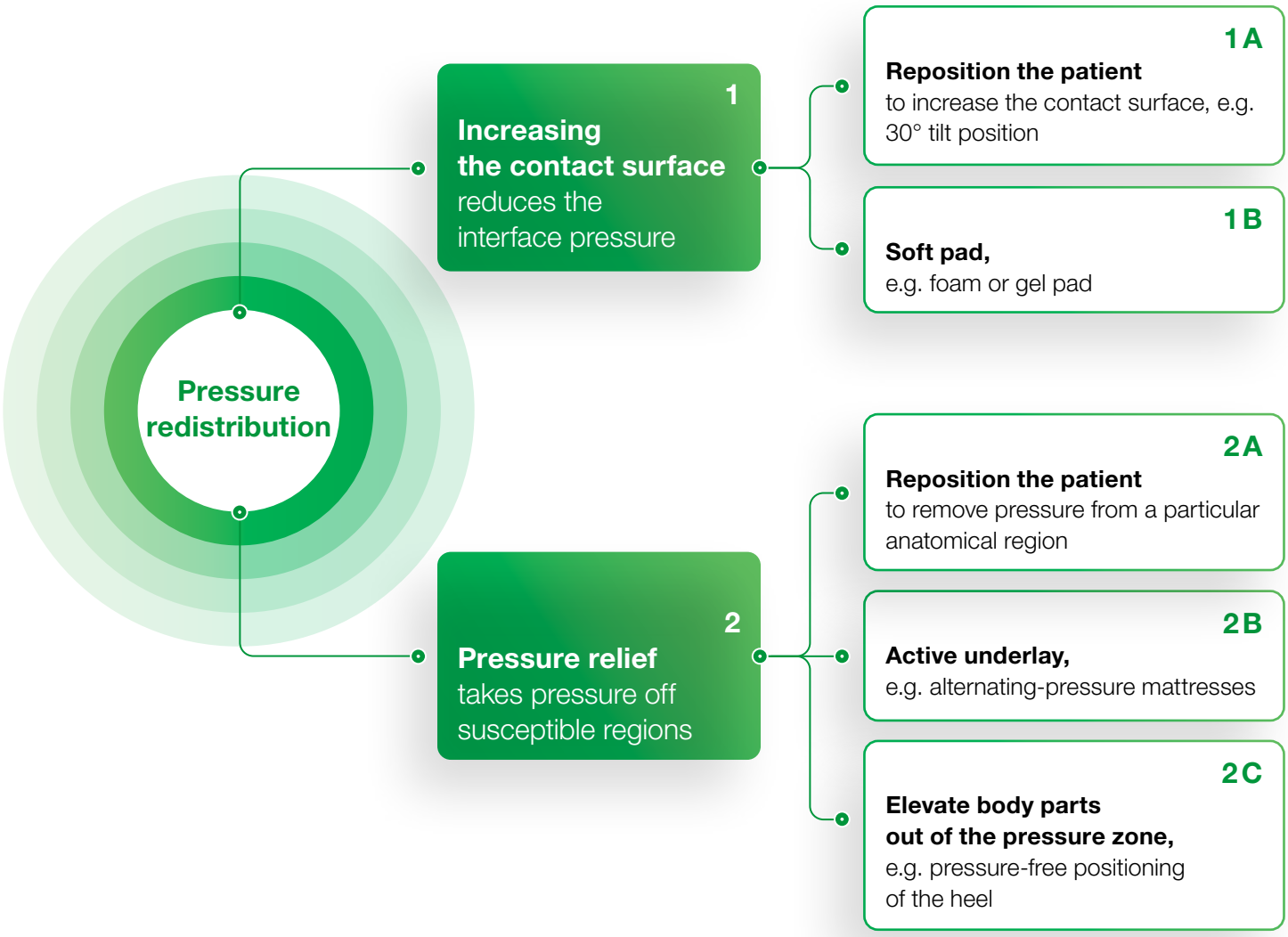
Delayed healing, (localised) excessive warmth and increased exudate, necrotic tissue, severe pain and foetid odours can, among other things, be signs that a pressure ulcer wound is infected. If this is the case, pathogen testing and consideration of an existing biofilm are necessary. Treatment using topical antiseptics and systemic antibiotics alongside regular debridement is recommended.[28]

According to the EPUAP 2019 guideline, the use of biological wound dressings may be considered for non-healing pressure ulcers. Modern treatments, such as the application of growth factors or biophysical agents can also be used to promote healing. For non-healing pressure ulcers, it may be necessary to consider surgical intervention in certain circumstances, such as suspected sepsis.

› **Caution:** be aware of non-verbal pain signals especially when providing wound care to patients with impaired consciousness and consider using analgesics.

Wound treatment in 3 steps:
our recommendation for successful wound care for pressure ulcers

Summary of the pressure redistribution principles



You can find further information on wound care and suitable wound dressings in our wound care brochure.

Download area for our informational materials

> “Contrary to widespread opinion, in Germany image documentation does not violate the right of the patient to his or her own image.”

Systematic documentation

Physicians and nursing staff have a responsibility or duty to document pressure ulcers, primarily so that the healing process can be monitored and assessed. This requires close observation and written documentation of the wound. Documentation of the observations and effect of the cause-related and nursing measures should be thorough and prompt.

Wound-related criteria that are recorded in the documentation system:[25]

- visual and verbal record of the area of the body where the pressure ulcer is located
- severity (category) of the pressure ulcer, stating the classification system used
- number of recurrences and time period without recurrences
- period of time from the formation of the pressure ulcer to the current assessment
- diameter and size of the pressure ulcer and measurement of the depth
- assessment of the wound bed with tissue types that dominate the wound
- wound edges and area around the wound
- exudate, transudate
- wound odour and signs of inflammation

The omission of the required documentation can be taken as an indication that the risk of pressure ulcers was not identified or no preventative measures were taken.

Good to know:

“Contrary to widespread opinion, in Germany image documentation does not violate the right of the patient to his or her own image.”

On this matter, the Higher Regional Court of Cologne said (2001) that documentation is not taken to mean only “word documentation”. “On the contrary, with image documentation, the legitimate interests of the patient, the bearer, the nurse or physician are protected and fixed.”

Photo documentation

In addition to the written documentation, photo documentation is considered and accepted form of evidence documented during the initial assessment of the patient upon admission and crucial evidence to show that the measures by the physician or nurse were either implemented or not implemented in the treatment of the pressure ulcers.

› Tips for photo documentation:[29]

- when a patient with a pressure ulcer is admitted, the wound should be photographed with a measuring tape beside it (assuming the patient gives consent)
- for better comparability, the photos should always be taken from the same perspective; even the position of the patient should always be the same
- large and circular wounds cannot be adequately captured by just one photo

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