

Collection of Practical Guides of Wounds of the Servizo Galego de Saúde

Practical Guide for Pressure Ulcers. Guide No. 1



**COLLECTION OF PRACTICAL GUIDES OF
WOUNDS OF THE SERVIZO GALEGO DE SAÚDE**

**PRACTICAL GUIDE FOR
PRESSURE ULCERS**

Guide No. 7

Xunta de Galicia
Consellería de Sanidade
Servizo Galego de Saúde
Dirección Xeral de Asistencia Sanitaria
2016

Publisher: Xunta de Galicia
Consellería de Sanidade
Servizo Galego de Saúde
Dirección Xeral de Asistencia Sanitaria

Graphic design and layout: Versal Comunicación, S.L.

Year: 2016



Licence: Creative Commons Attribution-ShareAlike 4.0 International (CC BY-SA 4.0)
<http://creativecommons.org/licenses/by-sa/4.0/>

COLLECTION OF PRACTICAL GUIDES FOR WOUNDS OF THE SERVIZO GALEGO DE SAÚDE

- **No.1 PRESSURE ULCERS**
- **No.2** Lower Limb Ulcers
- **No.3** Diabetic Foot Ulcers
- **No.4** Neoplastic skin lesions
- **No.5** Burn injuries
- **No.6** Acute surgical wound
- **No.7** Moisture associated skin damages
- **No.8** Trauma wounds



PRESENTATION

Everyone knows that the approach to ulcers and wounds implies a health problem of great magnitude due to the extra financial cost it means for sustainability of the health system, due to the loss of quality of life in patients, due to the impact that it has on their families and carers, and also by the workload and clinical variability that their care represents for healthcare professionals.

From the Servizo Galego de Saúde, and more intensively from the General Sub-Directorate for Care Management and Organisational Innovation through the Health Care Integration Department, there is an awareness of the importance and impact of a proper management of the prevention and treatment of this type of lesions; so for several years we have been working to improve the structure, resources and conditions required, to try to normalise and systematise the care activity arising from this care process.

Through the **Úlceras Fóra Programme** the reference framework to develop and establish strategic lines in the approach of everything related to ulcers and wounds, one of the basic objectives proposed was to set common care criteria (to identify the risk, assess the lesions, establish preventive measures, establish treatments, use of products, monitoring, registration, etc.) which allow us to move towards the standardisation of criteria and a corresponding reduction in the clinical variability for this type of lesions.

That is why this **Collection of Practical Guides for Wounds from the Servizo Galego de Saúde**, describes the effort and enthusiasm of many professionals (doctors and nurses) to improve their clinical practice in the care and comprehensive approach to patients affected by ulcers and wounds, or at risk of suffering them, in order to incorporate the best available evidence to achieve an improvement in the patient's quality of care and safety.

Jorge Aboal Viñas
General Director of the Health Assistance Department
Servizo Galego de Saúde

PREFACE

This Practice Guide was developed with the participation of health professionals in primary care and hospital care of the Serviço Galego de Saúde and reviewed by expert professionals and scientific institutions at national level, under the coordination of the General Sub-Directorate for Care Management and Organisational Innovation and Direction of Sanitary Assistance of Sergas.

The recommendations for clinical practice based on evidence that are included in this guide are of a general nature and therefore do not define a single course of conduct to be followed in a procedure or treatment for the integral care that is intended to be carried out. Any amendment or variation of the recommendations set forth herein, shall be based on clinical judgement (internal evidence) of the health care professional who applies them and the best clinical practices of the time; as well as the specific needs and preferences of each patient in particular; the resources available at the time of the sanitary attention and in the regulations established by the institution or health centre where they are intended to be applied.

DISSEMINATION AND IMPLEMENTATION

The dissemination and implementation strategy of this practical guide; as well as, of the entire Collection of Practical Guides on Wounds of Sergas, shall be co-ordinated through the Technical Management of the Úlceras Fora Programme; that is to say, by the Health Care Integration Department, of the General Sub-Directorate General for Care Management and Organisational Innovation, of Sergas.

The diffusion process entails a ceremonial presentation at the Consellería de Sanidade of the Xunta de Galicia, the official presentation in all public institutions in the Sergas Healthcare Network, the dissemination of an official statement to the media, its disclosure in scientific events and dissemination on the Internet through the official website of Sergas.

VALIDITY AND UPDATE

The guide should be reviewed after 3 years from the date of its publication. Its updating can be performed before the end of this period if any of the recommendations of evidence modify its categorisation which may lead to a clinical risk of safety for the patient and / or affect the quality of care.

DECLARATION OF CONFLICTS OF INTEREST AND EDITORIAL INDEPENDENCE

The authors of this practical guide declare to have made an effort to ensure that the information contained herein is complete and up to date, and state that they have not been influenced by conflicts of interest that could change the results or contents during the preparation stage and its development. Likewise, the authors of the guide assume responsibility for the content expressed, which includes evidence and recommendations.

The editors of the Collection of Practical Guides for Wounds of the Servizo Galego de Saúde declare that there is editorial independence regarding the decisions taken by the technical management and the coordinators of the working group.

ASSESSMENT AND CLASSIFICATION OF THE EVIDENCE

The scientific evidence and recommendations set forth in this Practical Guide were the result of the assessment and analysis of the sources of information consulted as bibliographic reference (clinical practice guides, guides based on the best evidence, other documents based on evidence, systematic reviews and original articles); the critical reading method and consensus by nominal group between authors and panel of experts was used to prepare it.

The classification of the level of evidence and grading of the recommendations has been maintained while respecting the original source consulted and the scale of evidence that has been used. The method that CENETEC (National Centre of Technological Excellence in Health) of Mexico in the development of their clinical practice guidelines (GPC) has been used for this:

- Classify with the symbol **[E]** that evidence which is published in any GPC, followed by its alphanumeric classification (quality of the study, if it is referenced) and bibliographic citation.
- Categorise with the symbol **[R]** those recommendations identified by any GPC, followed by their strength of recommendation (by A-B-C-D levels, in descending order according to clinical importance, or by their grading in high-moderate-low evidence).
- Identify with the symbol **[GP]** those actions and / or activities considered as good practices, which are not referenced or supported by any GPC, but that appear in other documents based on the evidence (guides to good clinical practice, clinical pathways, protocols based on evidence, etc.) and whose evidence has been obtained through systematic reviews, meta-analyses, clinical trials, etc.

The scales on the level of evidence and degree of recommendations that are described in the contents of this practical guide can be consulted through the bibliographic sources referenced in the summary table of recommendations / evidence.

PRACTICAL GUIDE FOR PRESSURE ULCERS PRACTICAL GUIDE No 1

Collection of Practical Guides for Wounds of the Servizo Galego de Saúde



INDEX

01. LIST OF AUTHORS, COORDINATORS AND REVIEWERS	16
02. INTRODUCTION	18
2.1. Justification	18
2.2. Scope and objectives	18
2.3. Questions that this guide should answer	19
03. DEFINITION	20
04. EPIDEMIOLOGY	21
05. ETIOPATHOGENESIS. PREDISPOSING FACTORS. DIFFERENTIAL DIAGNOSIS	23
5.1. Etiopathogenesis	22
5.2. Predisposing factors	25
5.3. Differential diagnosis	26
06. CLASSIFICATION	27
07. GENERAL GUIDELINES FOR PREVENTION	31
7.1. Risk assessment of developing PU	31
7.2. Skin assessment and care	33
7.3. PU prevention plan	33
7.4. Records	37
7.5. Education of the patient and carers	37
08. GENERAL GUIDELINES FOR TREATMENT	38
8.1. General assessment of the patient with PU	38
8.2. Specific assessment of the pu and the perilesional skin	39
8.3. General care of the patient in PU treatment	41
8.4. Specific care of the patient in PU treatment	45
09. SUMMARY OF EVIDENCE RECOMMENDATIONS	55
10. LITERATURE	68
11. ANNEXES	72

01 LIST OF AUTHORS, COORDINATORS AND REVIEWERS

TECHNICAL MANAGEMENT

Úlceras Fóra Programme

Health Care Integration Department. General Sub-Directorate for Care Management and Organisational Innovation. Directorate General of Health Care. Servizo Galego de Saúde (Sergas).

programa.ulceras.fora@sergas.es

WORKING GROUP

AUTHORS OF THE GUIDE

Estela M^a Souto Fernández

Nurse at the University Hospital of A Coruña Organisational Structure of Integrated Management of A Coruña.

Ana Isabel Calvo Pérez

Primary care nurse Technician of the Health Care Integration Department General Sub-Directorate for Care Management and Organisational Innovation. Directorate General of Health Care. Sergas.

Francisco Javier Rodríguez Iglesias

Primary care nurse Organisational Structure of Integrated Management of Santiago de Compostela.

COORDINATORS OF THE COLLECTION OF GUIDES

José María Rumbo Prieto

Supervisor for Care, Research and Innovation. University Hospital Complex of Ferrol Organisational Structure of Integrated Management of Ferrol.

Camilo Daniel Raña Lama

Nurse Labañou Health Centre Organisational Structure of Integrated Management of A Coruña.

María Blanca Cimadevila Álvarez

Head of the Health Care Integration Department General Sub-Directorate for Care Management and Organisational Innovation. Directorate General of Health Care. Servizo Galego de Saúde (Sergas).

Ana Isabel Calvo Pérez

Technician of the Health Care Integration Department General Sub-Directorate for Care Management and Organisational Innovation. Directorate General of Health Care. Servizo Galego de Saúde (Sergas).

Josefa Fernández Segade

Technician of the Health Care Integration Department General Sub-Directorate for Care Management and Organisational Innovation. Directorate General of Health Care. Servizo Galego de Saúde (Sergas).

REVIEWERS

Panel of experts

- **Group of Trainers and Guides in Wounds for the Úlceras Forá Programme of Sergas**

- **Javier Soldevilla Agreda**

Director of the National Group for the Study and Advice on Pressure Ulcers and Chronic Wounds (GNEAUPP); Vice President of the Ibero-Latin- American Society for Ulcers and Wounds (SILAUHE).

- **Cristina Quesada Ramos**

Nurse. Buenavista-Portugalete Health Centre (Basque Country).

- **Carmen Outón Dosil**

Nurse. University Hospital Complex of A Coruña Integrated Management of A Coruña.

- **Pilar Rodríguez Robisco**

Nurse. ZAS Health Centre (Ames). Integrated Management of A Coruña.

Scientific Institutions and Societies

- **Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas (GNEAUPP)**

- **Asociación Nacional de Enfermería Dermatológica e Investigación del Deterioro de la Integridad Cutánea (ANEDIDIC)**

- **Sociedad Gallega de Heridas (SGH)**

- **Asociación Española de Enfermería Vasculuar y Heridas (AEEVH)**

- **Sociedad Española de Heridas (SEHER)**

- **Sociedad Gallega de Cirugía Plástica, Reparadora y Estética (SGCPRE)**

- **Asociación Gallega de Enfermería Familiar y Comunitaria (AGEFEC)**

- **Federación de Asociaciones de Enfermería Comunitaria y Atención Primaria (FAECAP)**

- **Asociación Gallega de Medicina Familiar y Comunitaria (AGAMFEC)**

- **Sociedad Española de Médicos Generales y de Familia (SEMG)**

- **Academia de Enfermería de Galicia**

- **Colegio Oficial de Enfermería de Lugo**

- **Colegio Oficial de Enfermería de A Coruña**

- **Colegio Oficial de Enfermería de Ourense**

- **Colegio Oficial de Enfermería de Pontevedra**

HOW TO QUOTE THE DOCUMENT

Souto-Fernández E. M., Calvo-Pérez AI, Rodríguez-Iglesias F. J.; Practical Guide for Pressure Ulcers [Practical Guide No.1]. In: Rumbo-Prieto J. M., Raña-Lama C. D., Cimadevila-Álvarez M. B., Calvo-Pérez A. I., Fernández-Segade J., editors. Collection of Practical Guides for Wounds of the Servizo Galego de Saúde Santiago de Compostela (A Coruña): Xunta de Galicia. Consellería de Sanidade. Servizo Galego de Saúde; 2016.

02 | INTRODUCTION

2.1. JUSTIFICATION

The approach to chronic ulcers and wounds implies a health problem of great magnitude due to the extra financial cost it means for the health systems, due to the loss of quality of life in patients, due to the impact that it has on their families and carers (which in many cases have to take on the prevention and caring), and also by the workload that their care represents for healthcare professionals. Therefore, the decision-making regarding its approach requires taking into account several alternatives from a variety of information sources (clinical data, professional experience, preferences of the patient, scientific evidence, protocols, guides, etc.) which in turn causes a considerable variability of decisions based on the time, the information available and the person who decides. This gives rise to a great disparity in the performance of the professionals in techniques, tests, and diagnostic skills, clinical judgement and decision-making when facing the same problem or patient and even in a same professional in relation to patients with the same clinical and pathology.

This *Practical guide for pressure ulcers* (Practical guide No. 1) is integrated into the Collection of practical guides for wounds of the Servizo Galego de Saúde; in accordance with the strategies and lines of action promoted through the Úlceras Fora Programme coordinated by the General Sub-Directorate for Care Management and Organisational Innovation. In turn, such a collection, is aligned in line with strategy No. 10 (Improving clinical practice), of the Quality Plan for the National Health System 2010, as well as, with Sergas Strategy 2014: Public health at the service of patients.

This guide is therefore meant as a synthesis of the best interventions and preventive or therapeutic practices available for the care of people with pressure ulcers or at risk of suffering them; according to the clinical practice based on the most current evidence.

2.2. SCOPE AND OBJECTIVES

The scope of the Guide is addressed to people affected, informal carers and all health professionals with direct or indirect responsibility for the integral approach of pressure ulcers, in any of the three health care levels in the Community of Galicia: Primary Health Care, Hospital Care and Socio-Health Care.

The aim of the guide is to provide guidelines and/or standardised criteria to serve as a reference to identify risk factors, perform specific actions of prevention, detection, referral and treatment, which pressure ulcers pose as a health problem. The aim is to contribute to the welfare of people, reduce the variability of treatments and professional uncertainty, reduce the prevalence and incidence of this health problem in society, as well as achieve greater optimisation in the management of human and economic resources available from the Galician health and socio-

health care system based on the recommendations of practice based on evidence and; to attain a few quality care indicators for the care and safety of patients that shall allow for greater efficiency of the process between the different care levels.

2.3. QUESTIONS THAT THIS PRACTICAL GUIDE SHOULD ANSWER

- What are they and how are pressure ulcers defined (PU)?
- What is their epidemiology and pathogenesis?
- How are they classified?
- What are the most frequent locations?
- How to diagnose and/or differentiate a PU?
- What treatments and/or therapeutic measures are most appropriate?
- What complications can occur?
- What prevention recommendations are the most indicated?
- What treatment recommendations are best?
- What therapeutic guidelines and health education should patients, informal carers and professionals follow to facilitate their care?

03 DEFINITION

After the first definition of pressure ulcer (PU) published in 1975¹ this concept has undergone several revisions and amendments. In 2009, the American Committee National Pressure Ulcer Advisory Panel (NPUAP) together with the European Pressure Ulcer Advisory Panel (EPUAP) conducted the last revision, defining PU as:

*A lesion located on the skin and/or the underlying tissue usually on a bony prominence, as a result of the pressure, or pressure in combination with shear. A number of contributing factors or confounding factors are also associated with pressure ulcers; the importance of these factors has not been elucidated yet.*²

However the National Group for the Study and Advice in Pressure Ulcers and Chronic Wounds (GNEAUPP), in its Technical Paper No. II (2014), taking into account recent developments, especially the new theoretical model developed by García Fernández et al.³ proposes the following definition, basically coinciding with the EPUAP/NPUAP:

A lesion located in the skin and/or the underlying tissue usually on a bony prominence, as a result of the pressure, or pressure in combination with shear. To which it adds that, sometimes it can also appear on soft tissues subjected to external pressure due to different materials or clinical devices.

04 EPIDEMIOLOGY

The PU are a problem of significant magnitude, even more so if we consider that more than 95 % are avoidable⁴ and their presence is an negative quality indicator.^{5,6} Not only do they generate a health problem, but also a high economic cost to the healthcare system.

In 2006, there was a study called *"An approximation to the impact of the economic cost of the treatment of pressure ulcers in Spain"*⁷ which stated that the cost per episode was €211 for the stadium/category I and €16,600 for the stadium/category IV.; with the overall cost being approximately 1,687 million euros, which meant 5.2 % of the total healthcare expenditure of our country.

Currently, according the GNEAUPP, the estimated cost for the treatment of PU exceeds 600 million euros/year; and affects the daily lives of more than 90,000 people (20 % <65 years) who receive home care, care in nursing homes or are treated in hospital centres in Spain. Taking into account the number of affected people, the cost of prevention has been quantified in €1.7/day, when curing a PU costs, at least, €46 per day.⁸

According to the 4th national prevalence study of PU in Spain,⁹ carried out in 2013, the figures for prevalence of PU in Spanish healthcare and social healthcare centres (CSS) have increased in the three levels of care in relation to the previous national studies:

- In primary care (PC) the prevalence is 8.51 % (range 7.96-9.1 %) for patients >14 years, included in the home care programme.
- In hospitalisation units the prevalence of PU in adults reaches 7.87 % (range 7.31-8.47 %) while in paediatric units it is 3.36 % (range 1.44-7.61 %).
- In the CSS the prevalence is situated in 13.41 % (range between 12.6-14.2 %), so it has increased by more than double with respect to previous statistics.
- Concerning the most frequent lesions, those of category I represent 15.2 %; category II 48.7 %; category III 21.2 % and those of category IV 11.3 %.
- The most frequent locations of the PU were: sacrum (30.7 %), followed by heel (28.6 %), trochanter (7.0 %), malleolus (6.4 %), buttocks (6.1 %), back foot/finger (4.7 %), ischium (3.5 %) and leg/knee (2.8 %).
- The greatest risk of developing a PU in the hospital sector, after the calculation of prevalence in adults adjusted according to the type of unit, is in the critical care units. In PC the adjustment of prevalence according to the location of the healthcare centre, indicates that it is lower in rural centres (population less than 10,000 inhabitants), and therefore higher in urban or mixed centres. In CSS, the prevalence is lower in the public centres compared to associated or private centres.

According to the national survey for adverse effects linked to hospitalisation (ENEAS), carried out in hospitals, adverse events (AE) related to care accounted for an incidence rate of 3.66 % of PU. Of these 55 % could have been avoided (according to the preventable rate).^(10,11) In the study on the safety of patients in primary health care (APEAS), the PU related as AE in primary care accounted for a prevalence of 3.4 %, with a preventable rate of 71.1 % .^(11,12)

Finally the study of adverse events in nursing homes and social care centres (EARCAS), carried out in CSS, highlights that the incidence of PU has an estimated risk of it happening several times a year, but less than once a month; even so, there is evidence that the appropriate training of professional would help to reduce the AE associated with PU in CSS by at least 70 %.^(13,14)

05 ETIOPATHOGENESIS. PREDISPOSING FACTORS. DIFFERENTIAL DIAGNOSIS

5.1. ETIOPATHOGENESIS

Pressure combined with time are the most important factors in the development of the PU, but recent research reveals that shear, friction, and microclimate also play a prominent role. There are also other external and intrinsic factors that affect the individual. Friction is not considered to be the direct cause of the PU, but it also participates in its development and is considered an important risk factor as the result of its contribution to the production of pressure forces due to shearing (table 1).¹⁵

MICROCLIMATE	The temperature of the tissues and the relative humidity between the body and the supporting surface, influences the sensitivity of the skin and soft tissues to the effects of pressure, shear and friction. And more specifically, if the temperature and humidity of the skin are raised in an area that is compromised by the effects of pressure, the skin and underlying tissues will have more risk of harm.
PRESSURE	This is defined as the projection of force carried out perpendicularly to the skin. It was considered as the direction that most comprised the tissues, but recent studies show that this pressure is only present in superficial tissues, since direct superficial force makes the deeper tissues distort in different directions. It is important to note that in the tissues next to bony prominences, the application of perpendicular forces to the skin surface also cause shearing.
SHEARING	It is a tangential and perpendicular force between the body and the surface. Shearing occurs due to the elasticity of the internal skin tissues skin or attached structures. Internal shear forces are considered to be particularly harmful and occur when the friction force is static, i.e. does not cause movement in this, but in the deeper tissues (subcutaneous, muscle and bone) it produces lesions that may not be visible at a superficial level.
FRICTION	It is a force that opposes (in the same direction and opposite direction) the movement of the surface of a bed or chair, as happens when a patient is dragged. This type of friction is called dynamic or friction. The static friction is one that is opposed to the start of the movement (prior to dragging), being perpendicular to the surface of the skin. The greater the perpendicular forces of the body the greater the force of friction. Friction is the cause of the rubbing between the skin and the supporting surface, weakening the former and is considered to be a factor that favours the appearance of shear forces in lower planes.
TIME	Studies on the relationship between time and magnitude of pressure show that the physio-pathological effects of this pressure are worse in less time and with more pressure.

Table 1: Most important factors involved in the development of pressure ulcers

The main production mechanism of the PU is based on poor blood supply to the area due to an external cause: pressure, which produces tissue crushing between two hard planes, one belonging to the individual (bone) and other external to it (surface of the bed, armchair, therapeutic devices, etc...) The pressure can be of two types (**illustrations 1 and 2**).¹⁶

- **Direct:** when the force is exerted perpendicularly, between the skin and bony prominences.
- **Due to Shear:** when tangential or parallel forces that distort the skin and underlying soft tissues become associated, causing an internal stretching of the tissues that induce lesions on the deep planes.

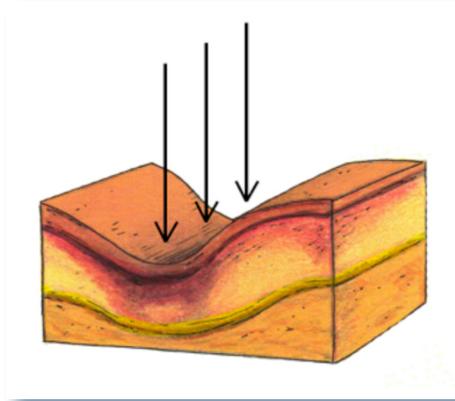


Illustration 1. Direct pressure exerted on the tissue

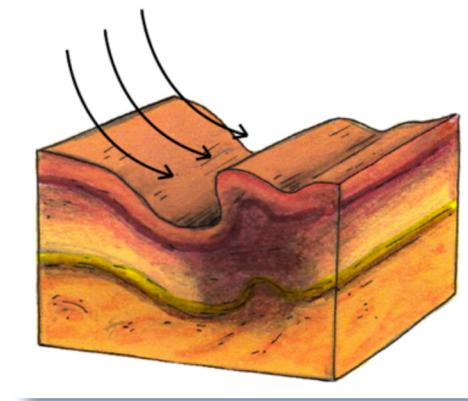


Illustration 2. Pressure due to shear exerted on the tissues

Skin subjected to extreme pressures, above the capillary pressure (>20 mm/Hg) and for a long time, may experience a change in colour, becoming pale due to the ischaemia process (lack of blood flow that leads to inadequate oxygenation which causes the degeneration of the skin tissue). When pressure is relieved and the pressure has not lasted long, the skin recovers its blood flow quickly with a reddish hue being seen (reactive hyperaemia), to then go on to recover its usual colour. But if the pressure has been prolonged and constant, then in the end there is tissue necrosis.^{3,16}

5.2. PREDISPOSING FACTORS

The limitation of mobility is the main risk factor when favouring the development of a PU, so patients that are bedridden and/or sitting should always be taken into account, as they have limited movement, as have a risk of developing this type of injury (**evidence B**).² This is because they are exposed to the forces of pressure, shear and also to friction.

Other risk factors are:

- **Skin condition:** Changes in the intact skin increase the probability of presenting a PU. While, patients with an ulcer of category I run the risk that the injury progresses toward a larger ulcer (**evidence B**).² Similarly patients with an active PU may develop a new lesion (**evidence B**).²
- **Altered nutritional indicators:** Once a nutritional assessment has been completed using a validated scale or quantification of the patient's intake (giving special consideration to a poor protein intake), the result obtained will provide information to determine if the patient is at risk or not.
Low weight (BMI < 18.5)¹⁷ and weight loss, also have to be taken into account (**evidence C**).²
- **Altered perfusion and oxygenation:** The presence of diabetes, vascular diseases, use of vasoactive drugs due to cardiovascular instability, low or high blood pressure, altered ankle-brachial index, tobacco consumption, presence of oedemas or oxygen therapy, are some of the factors that affect perfusion and oxygenation. Various researches have linked them with the development of pressure ulcers (**evidence C**).²
- **Moisture of the skin:** If moisture is excessive, this affects the skin's tolerance by altering its protective function and mechanics. The moisture may be due to an excess of perspiration and urinary and/or faecal incontinence (**evidence C**).²
- **Body temperature:** The presence of elevated body temperature is associated with the emergence of PU (**evidence C**).²
- **Advanced age:** Combined with other factors it increases the risk, especially in patients older than 75 years (**evidence C**).²
- **Limited sensory perception:** This reduces the capacity to respond appropriately to the problems arising from the pressure on any part of the body. This type of situation occurs in states where there is a low level of consciousness or sedation, or when there is a loss of sensation in any part of the body, as occurs in patients suffering from diabetic neuropathy, spinal cord injuries or in some patients who have suffered a stroke (**evidence C**).²
- **Haematological parameters:** Some studies have provided statistical association between changes of urea and electrolytes (urea > 1mg/dl), high C-reactive protein, lymphopenia, hypoalbuminemia and a reduction in haemoglobin, and the development of PU. These parameters can be secondary to various causes (malnutrition, blood loss during surgery...) affecting the reparation, transport and thermodynamic function of the skin (**evidence C**).²

- **State of general health:** The presence of chronic diseases, surgical interventions, medical treatments, states of mental confusion among others, can increase vulnerability to develop PU, as they affect nutrition, perfusion, or moisture of the skin (**evidence C**).²

5.3. DIFFERENTIAL DIAGNOSIS

Pressure ulcers should be differentiated from lesions caused by moisture, ulcers of vascular origin, from diabetic foot ulcers and lacerations.¹⁸

To make an early diagnosis special attention should be paid to those erythemas that appear on bony prominences. If the erythema is blanchable (it blanches when pressing with a finger or transparent disc), it should disappear in several hours once the pressure is eliminated, except in those cases resulting from an inflammatory process not related with the pressure, where the capillaries would not be affected. If, on the contrary, there is an erythema that does not blanch (non blanchable), this would suggest that the tissue is already damaged, where it would also be necessary to eliminate the pressure so as not to increase the tissue injury. If in addition the skin appears indurated or fluctuating this reflects a possible damage that remained over time¹⁹ (**annex I: assessment of the erythema**).²⁰



Figure 1. Non blanchable erythema PU

06 CLASSIFICATION

In the consensus document carried out between EPUAP, NPUAP and PAN PACIFIC published in 2014 four categories are still proposed to classify the PU.²

In its definition a category reflects the maximum depth of the affected tissue after the withdrawal of the non-viable or necrotic tissue. The reversal of the category should not be used as a system to describe the healing of a PU, therefore category IV PUs are not converted into category III, II or I lesions.

CATEGORY I: non blanchable erythema on intact skin.

In this category the skin is intact with non blanchable erythema (that does not blanch) in a localised area, usually on a bony prominence. May be present: skin discolouration, heat, oedemas, calluses or pain. The area may be painful, firm, smooth, hotter or colder in comparison with the adjacent tissues. This category can be difficult to detect in individuals with dark skin (**annex 1**).

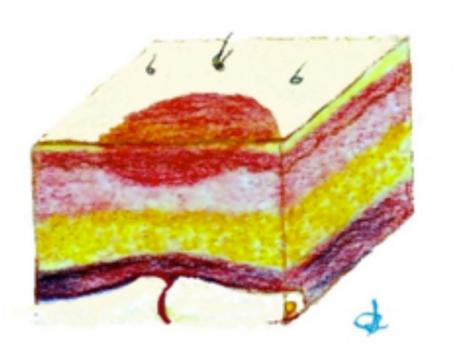


Illustration 3. Category I



Figures 2 and 3. PU category I

CATEGORY II: partial loss of the thickness of the skin or blister.

This is characterised by the loss of partial thickness of the dermis, appearing as a shallow open sore, with the wound bed being between pink and red, without slough. It may also appear as an intact blister that is full of serum or a broken one.

It is a superficial ulcer that can be shiny or dry, without slough or bruises (a haematoma indicates an injury of the deeper tissues).

This category should not be used to describe lacerations, bandage lesions, dermatitis associated with incontinence, maceration or chafing.

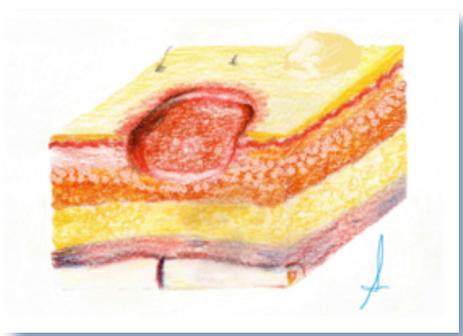


Illustration 4. Category II



Figure 4. Category II PU

CATEGORY III: total loss of the skin thickness.

This third group will include those cases where a complete loss of tissue is seen. The subcutaneous fat may be visible but bones, tendons or muscles are not exposed. Slough may be present but will not hide the depth of the lesion. It can include cavitations and tunnelling.

The depth varies according to the anatomical location. The nose, ear, occipital and the malleolus have no subcutaneous tissue (adipose tissue) and the PU in this category can be shallow. However, areas of important adiposity may develop extremely deep category III PU. In any case, bone or tendon is not visible or directly palpable.

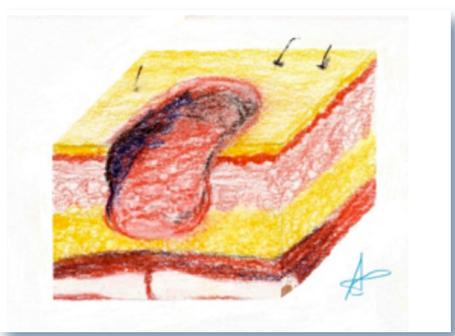


Illustration 5. Category III



Figure 5. Category III PU

CATEGORY IV: total loss of thickness of the tissues.

Within this category are classified those injuries where there is a total loss of tissue thickness with exposed bone, tendon or muscle. Slough and sores may appear. Frequently include cavitations and tunnelling (channels). The depth of the PU in this category varies according to its anatomical location; in the nose, ear, occipital and malleolus where there is no adipose tissue they are shallow, however, in areas with significant adiposity they can be extremely deep. They can extend to muscle and/or support structures (the fascia, tendon or joint capsule) with risk of osteomyelitis or osteitis being produced. The bone/muscle exposed is visible or directly palpable.

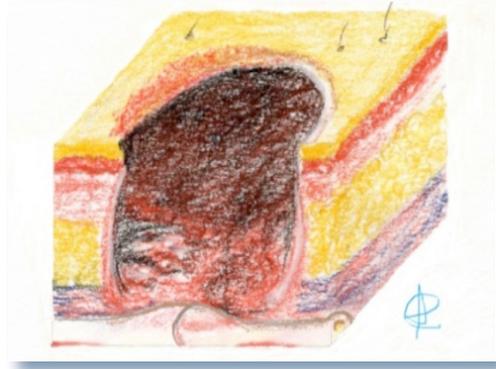
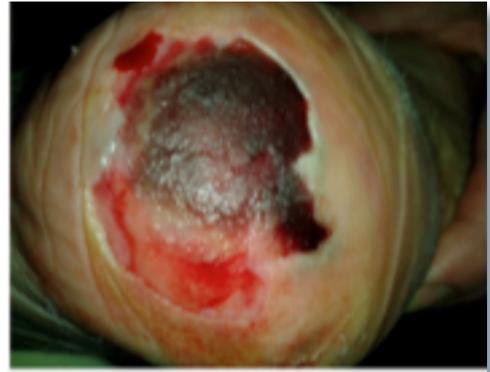


Illustration 6. Category IV



Figures 6 and 7. Category IV PU

Some lesions shall be considered as not being able to be given a category, until a debridement is carried out to establish the depth such injury has.



Figures 8, 9 and 10. PU that cannot be given a category

A deep injury or one with unknown depth is suspected, when we find a localised purplish or darkish brown area, with discoloured skin or blister with blood, due to damage of the underlying soft tissues produced by pressure or shearing.



Figure 11. Deep tissue lesion

07 GENERAL GUIDELINES FOR PREVENTION

INITIAL CONSIDERATIONS

Preventative measures must be applied to all those patients at risk of developing pressure ulcers and to all those who already suffer from one or several PU.¹⁸ The risk assessment should be made both to hospitalised patients and those who are in the community. The frequency and magnitude of these assessments will vary depending on the risk factors.

For immobilised patients included in home-based care programmes, hospitalised and those resident in institutions, the assessment of the risk and the skin must be recorded in the patient's clinical history. It should also be recorded in the prevention plan, indicating that it is not applicable when the risk is minimal.

All professionals involved in the patient process must play an active role in the development of the protocol for the prevention of PU. In some cases, as in patients undergoing palliative care, the goals for care may be different, rewarding aspects such as the relief of pain and the promotion of general well-being.¹⁸

Interventions aimed at the prevention are:

1. Risk assessment of developing PU
2. Skin assessment and care
3. PU prevention plan
4. Records
5. Education of patients and carers

7.1. RISK ASSESSMENT OF DEVELOPING PU

Note that there are special populations, such as children and the elderly. In the case of children, the smaller they are in age, the greater the ratio of body surface (loss of heat) and total body mass (heat production), so that heat loss is easier and faster, besides not having mechanisms of defense to the cold: they don't have a mature thermoregulatory system. As for the elderly, there is a decrease in basal metabolism, so that their production of heat is lower.

7.1.1. HOSPITALISED PATIENTS

All hospitalised patients must have the risk of developing PU assessed at the time of their admittance, using a validated risk assessment tool.

The scale chosen by Sergas and is preferred by the scientific community, is the Braden scale for adults and the Braden Q scale for children (between 1 month and 14 years) . Although there are also other tools available to assess the risk of PU such as the Norton scale and the EMINA scale.^{18,20}

The Braden Scale is the most used validated tool to predict the risk of developing PU in adults. This is due to its high sensitivity and specificity in predicting this risk. It was developed and tested for the adult population and presents 6 subscales: sensory perception, exposure to moisture, activity, mobility, nutrition and risk of skin lesions. It serves as an aid to the individual clinical trial, and it is important for the health system that the score on the Braden Scale is taken into account at the time of planning interventions aimed at prevention.¹⁸ This scale classifies the risk as **high, moderate or low** depending on the score obtained when undertaken (**annex 2**).

The Braden Q scale is a modification of the Braden Scale to be used with patients aged between 1 month and 14 years. It has seven subscales: mobility, activity, sensory perception, skin moisture, friction and shear, nutrition and tissue perfusion and oxygenation. The Braden Q scale classifies the paediatric patient in: **with risk and without risk**²⁰ (**annex 3**). The use of a reliable and validated instrument -like the Braden Q- to assess the PU risk in the paediatric population must be taken into account in order to facilitate a structured assessment (**evidence C**).²

The risk will be assessed with the aforementioned tool, as soon as possible within the first eight hours after the patient's admission. The re-assessment will be carried out as regularly and frequently as the seriousness of their condition requires. It must also be reassessed if there had been any change in the status of the patient or transfer of unit (evidence C+)².

7.1.2. PATIENTS IN THE COMMUNITY AREA

The risk of developing PU must be assessed in all those patients included or likely to be included in the home-based care programme, and patients in the sociosanitary area, as well as those patients that do not actually appear as a hospital admission as they attend day hospitals, emergency services, radiology services, surgery units without admission...

The aging of the population and the increase of the chronically ill, due to the increase of their survival, causes a greater number of patients at home with a risk of developing pressure ulcers. It would be desirable to carry out a series of questions to the patient or carer while not being able to use the validated tool (Braden Scale), with the objective of identifying early those patients that are susceptible, and in this way give them priority when carrying out the home-based care. This measure is also considered useful for those services in which there are non-hospitalised patients, such as those mentioned above.

Questions asked should be:

- If the patient is bedridden, in a wheelchair or needs assistance to be moved
- If the patient is incontinent (urine and/or faeces)
- If the patient has or had any PU
- If they are apparently malnourished

If any of these answers is YES a PU prevention plan should be started.¹⁸

7.2. SKIN ASSESSMENT AND CARE

All patients should have their skin examined as soon as possible after admission and bony prominences should be specifically felt, assessing the following aspects:¹⁸ Alteration in skin moisture, changes in the texture, turgor, temperature changes compared to the surrounding skin, changes on colour, consistency, oedema, cracks, blisters, rashes, drains, pain and itching.

The re-examination should be carried out after 8 or 24 hours, depending on the patient's situation. In the case of patients with diagnostic or therapeutic devices, the skin around and below them, must be re-examined twice a day and should be more frequent in patients with localised or generalised signs of oedema (**evidence C**).² Both children and adults carriers of such devices,* must be considered to be at risk of developing a PU² (**evidence B**).²

(*) Invasive mechanical ventilation masks, endotracheal and nasotracheal tubes, nasal tubes, cervical collars, halos, external mountings, faecal containment devices, urinary catheters, surgical drains, central catheters, counterpulsation balloon, intermittent pneumatic compression devices, splints, supports...

In connection with skin care, it is recommended that the skin be kept hydrated using moisturising creams to decrease the risk of damage (**evidence C**).² The use of hyper-oxygenated fatty acids on the risk areas is also recommended in our environment (**evidence high**).¹⁶

It is not advisable to perform massages to prevent the PU, since the capillaries can be damaged or the skin may be fragile. Nor should it be rubbed vigorously (**evidence C**)² and whenever possible it is advisable not to support the patient on an erythema (**evidence C**).²

The skin must be protected from the excesses of moisture as this weakens and destroys the external lipid layer, as less force is required to injure the skin and cause a break in this.^{18, 21}

7.3. PU PREVENTION PLAN

The prevention of the PU incorporates the following interventions:

7.3.1. MANAGEMENT OF PRESSURES

7.3.1.1. MINIMISE AND/OR ELIMINATE FRICTION AND SHEAR

- Separate the body from the bed or chair when the patient is moved over this, avoiding any dragging.
- Avoid postures like the Fowler (over 30°) or the half laying position as long as the patient's condition permits (**evidence C**).²
- Use resources to avoid friction and shearing as transfer devices (cranes, tables, rotating discs, draw sheets...) mattresses and mattress protectors made with appropriate materials.
- Assess the skin often when using beds with the possibility of lateralisation, since the risk of injury by shearing exists when patients are lateralised (**evidence C**).² Lateral rotation does not replace the need for repositioning.
- Position pillows between areas of skin contact and of those that are in contact with devices, to avoid friction.

- Consider in some cases (patients with very fragile skin) the use of transparent films or hydrocolloid dressings over bony prominences, in order to reduce friction.
- Patients should be rolled to position the urinal instead of pulled and pushed backwards and forwards.

7.3.1.2. MINIMISE THE PRESSURE (UNLOAD)

- Immobility is the most important risk factor in the development of pressure ulcers. Patients who have some degree of immobility should be closely monitored to prevent the development of PU. On the other hand, it is important in these situations to consider the extent of passive movement to prevent muscle contractions, and resort to physiotherapists when additional treatment is needed.
- Postural changes should be made to reduce the duration and the magnitude of the pressure on vulnerable areas of the body (**evidence A**)² (**annex 4**).
- The frequency of postural changes will be determined by the tolerance of the individual's tissue, their degree of activity and mobility, their general health status, the global objectives of the treatment and an assessment of the status of the individual's skin (**evidence C**).²
- The frequency of postural changes will be influenced by the support surface used (**evidence A**).² Although as a rule, these should be carried out every 2-3 hours if the situation of the patient allows (**annex 4**).
- Postural changes shall be carried out using the semi-Fowler position of 30° (maximum), or the supine and the lateral decubitus position with an inclination of 30°. These three positions can be alternated avoiding postures that increase the pressure, like the Fowler of more than 30°, or the 90° lateralisation to prevent support on the trochanter (**evidence C**).²
- When patients are sitting they suffer from increased intensity of pressure on bony prominences involved due to a lower weight distribution, there is also a tendency to slipping which causes shearing and destruction of tissue in the affected areas. When the patient is in a sitting position, it is important to reposition them every 15 minutes using their arms, if they are able to carry it out independently, if this were not the case it should be carried out by their carers. The time an individual spends sitting in a chair with no pressure relief should be limited (**evidence B**).²
- In the case of children and neonates, it is important to frequently reposition the head when they are sedated and with ventilation (**evidence C**).² This is due to the high risk of developing pressure ulcers in the occipital area.
- The pattern of postural changes should be recorded, specifying the frequency, the position taken and the assessment of the result of the repositioning regime or plan (**evidence C+**).²

7.3.1.3. SPECIAL SURFACES FOR MANAGING PRESSURE ULCERS (SEMP)

- Choose the **SEMP** according to the needs of the individual, their weight and height, the redistribution of pressure, immobility and inactivity and the need to control the microclimate and reduce the shear (**evidence C**).²
- It is necessary to continue carrying changes in posture to patients placed on a **SEMP**, because it is necessary to continue easing the pressure, while at the same time facilitating patient comfort. However, the frequency of repositioning can be varied due to the use of this surface (**evidence C**).²
- The use of high density foam or memory foam mattresses is recommended, before those mattresses that do not have this type of foam, in all those patients whose assessment indicate they are at risk for developing a PU (**evidence A**).²

- When patients with high risk cannot be repositioned manually, dynamic support surfaces must be used (mattress or mattress covers) **(evidence B)**.²

STATIC SEMP	DYNAMIC SEMP
High density foam, memory foam.	Alternating air, medium and/or large cells.
	

Table 2. Special surfaces for managing pressure ulcers (SEMP)

- The use of devices that raise and unload the heel completely are also recommended, in such a way as to distribute the weight of the leg along the calf without exerting pressure on the Achilles tendon **(evidence B)**.² Their use is indicated in situations where they are going to be needed in the longer term, or when the patient cannot keep their legs on the pillows, so that the heels are not supported on the bed. Knees in both cases should be semi bent at an angle of 50 to 100, since the hyperextension of these could cause obstruction of the popliteal vein and predispose to a deep vein thrombosis **(evidence C)**.²



Figure 12. SEMP specific for the heel

- In connection with the support surfaces to prevent the PU while sitting, a seat cushion that redistributes the pressure should be used, in those patients whose mobility is limited **(evidence B)**.²
- In response to the morphology, ring or doughnut shaped devices should be avoided, due to the edges of these devices creating areas of high pressure that may damage the tissues **(evidence C)**.²

7.3.2. MANAGING MOISTURE

There is a special interest, as reflected in various studies, by the effects of the microclimate in the formation of ulcers. Within the main actions of moisture control, the following should be taken into account: if the patient is incontinent, what type of incontinence they suffer, if it can be eliminated and if this is not the case what type of devices are the most appropriate. In the case of the faecal incontinence, if the patient meets the criteria bypass devices and faecal collection devices can be used.

Other measures are to keep the patient dry, preventing exposure of the skin and cleaning it as soon as possible with water and soap with a suitable pH level.

If the patient sweats a lot then the clothes must be changed frequently, including the sheets. In the same way, one must protect the skin from exposure to excessive moisture with a product barrier and thus reduce the risk of injury **(evidence C)**.² ASkin damaged by moisture is not a PU, but the presence of a lesion of these features may increase the risk of developing it.

For more knowledge about the skin lesions associated with moisture we recommend the *Practical Guide to skin lesions associated with the Moisture*, Practical Guide No. 7 of this collection, be consulted.

7.3.3. MANAGEMENT OF NUTRITION AND HYDRATION

It is recommended that the nutritional status of the patient at risk of developing pressure ulcers be assessed, and if necessary they should also be referred to a Multidisciplinary Nutritional team.¹⁸ This team after performing the assessment, if they find a patient with poor nutritional status could prescribe supplements rich in proteins, or enteral / parental nutrition.

	PROTEINS	FLUIDS	CALORIES
Intact Skin	0.8 - 1.0 g / kg	30 ml / kg / day	30 kcal / kg / day

Table 3. Nutritional recommendations for patients at risk²²

The recommended actions are:

- Provide and promote the daily intake of fluids for the adequate hydration of patients with PU risk. This must be compatible with the comorbidity of the individual and the targets set **(evidence C)**.²
- Consider whether the patient has some type of barrier to achieve optimal nutrition, including chewing, swallowing and social implications.¹⁸
- Also consider the cognitive function, including the ability to be able to eat by themselves **(evidence C)**.^{2,18}
- Obtain anthropometric values such as the BMI, as well as to detect changes in weight.¹⁸
- Sometimes certain laboratory values whose change may indicate malnutrition like those for albumin, prealbumin and transferrin may not reflect the current nutritional status in the critically ill, but the following aspects must be taken into account to establish a nutritional plan: weight loss, serious illness, condition of the patient and gastrointestinal function.¹⁹

7.4. RECORDS

The prevention plan should be included in the clinical history, as well as the risk assessment. If the patient is transferred to another unit or is discharged from the hospital and is at risk of PU, all those specific interventions that the patient requires must be recoded, together with all the interventions that were made. In the reference service or in the patient's home, the needs to confirm that there is material and sufficient resources for their attention shall be assessed again.

Postural changes should be recorded by specifying the frequency and the position taken, and include an assessment of the results observed **(evidence C)**.²

7.5. EDUCATION OF THE PATIENT AND CARERS

Patient education is an important link in the prevention of PU. The patient, family and caregivers must be trained from the moment that this risk is detected, included in this training concepts on **(evidence C)**:⁴

- Causes of appearance of the PU
- Ways to prevent them
- Diet
- Positioning

When the patient is discharged, they must be provided with information in writing that details how the care that must be performed should be carried out.

08 GENERAL GUIDELINES FOR TREATMENT

The care of the patient with PU is the responsibility of health care workers in a multidisciplinary manner, of the patient and his family or informal caregivers; and should be directed mainly to the specific treatment of the lesion, but also to the cause that originated it: the pressure maintained over time.

8.1. GENERAL ASSESSMENT OF THE PATIENT WITH PU

A general assessment of the patient must be made based on the models of *Basic Needs* by Virginia Henderson or *Functional Patterns* by Marjory Gorgon, taking into account the aspects listed in the following figure:

GENERAL ASSESSMENT OF THE PATIENT	
<p>Most relevant health problems:</p> <ul style="list-style-type: none"> • Metabolic. • Cardiovascular. • Cerebrovascular. • Respiratory. • Neurological. 	<p>Pharmacological or physical treatments:</p> <ul style="list-style-type: none"> • Psychoactive drugs. • Sedatives. • Anticoagulants. • Vasoconstrictors and/or devices and supports.
<p>Full physical examination:</p> <ul style="list-style-type: none"> • Skin condition. • Mobility. • Moisture. • Consciousness. • Elimination. • Nutrition. 	<p>Psychosocial assessment:</p> <ul style="list-style-type: none"> • Personal autonomy • Ability to look after themselves • Family, social and working relationships... <p>Assessment of the scope of the care:</p> <ul style="list-style-type: none"> • Identity of the main carer. • Assessment of the attitudes. • Skills, knowledge. • Material resources. • Social support.

Chart 1: General assessment of the patient

8.2. SPECIFIC ASSESSMENT OF THE PU AND THE PERILESIONAL SKIN

The use of a validated scale to assess the progress of the PU is recommended (**evidence B**).²



Figure 13. Measurement of a PU

The ulcer will be measured using the same method during the whole treatment process, in order to facilitate comparisons of the measurements over time (**evidence B**).² The use of photography should be considered to monitor the evolution of the PU (**evidence C**)² (**annex 5: paragraph 1**).

Monitoring index of the PU	The dimensions of the ulcer, the amount of exudate and the type of tissue that the ulcer bed shows will be assessed using a numerical score, which give us a value that can be compared with previous measurements, thus obtaining a points chart that informs us of the ulcer's evolution (annex 5).
RESVECH	6 items are assessed through scoring: size, depth of the affected tissue, type of tissue, exudate and type of infection/ inflammation/ biofilm signs. Considering values of 0 for the ulcer that has healed, up to a maximum of 36 as the worst wound possible. ²³
Photographic Record	Whenever possible and with the prior consent of the patient.

Chart 2: Registration systems for the evolution of a PU

All aspects listed in the following table will be taken into account for the specific assessment of the lesion:

Size
<ul style="list-style-type: none"> • Parameter that indicates the progress or reversal of the healing in a quantitative mode. • The size of the ulcer is inversely proportional to a correct evolution. • Place the individual in a neutral position that allows the wound to be measured.
Location
<ul style="list-style-type: none"> • Anatomical area referring to a bone level. • The most frequent PUs are located in the sacrum, calcaneus and trochanter.
Depth of the affected tissue
<ul style="list-style-type: none"> • Will refer according to the affectation of the various levels of tissue and structures. • They are classified in categories of I, II, III and IV from lesser to greater depth.
Tunnelling or fistulas
<ul style="list-style-type: none"> • Duct covered by tissue with one or more entrance doors. • Special care will be taken to fill them by at least half of their volume and up to three quarters, to ensure that there is no false closure leaving a sac that would favour their recurrence. • Care not to cause lesions when measuring the depth or the extension.
Type of tissue
<p>Four types of tissue are differentiated:</p> <ul style="list-style-type: none"> • Necrotic or black phase: dark, black or brown tissue that adheres firmly to the bed or to the edges of the ulcer. • Slough, fibrin or yellow stage: yellow or white tissue that adheres to the ulcer bed with a fibrous appearance bands, blocks or soft mucus tissue. • Graininess or red phase - reddish or pinkish tissue with granular appearance, wet and bright. • Epithelisation or pink phase: in superficial ulcers, new tissue or skin, pink and bright that grows near the edges of the ulcer or islets on the surface.
Exudate
<ul style="list-style-type: none"> • Type: Serous, haematic or purulent. • Quantity: null, low, moderate or abundant.
Periulceral skin
<ul style="list-style-type: none"> • Intact: presents no problem. • Lacerated: broken and/or torn tissues. • Macerated: whitish skin with milky appearance. This implies that it has excess moisture. • Eczematous: signs of flaking.
Infection
<ul style="list-style-type: none"> • Non-existent: with no clinical signs of infection. The ulcer may be contaminated or colonised without altering the healing process. • Suspicion: critical colonisation, without clear signs but with alteration of the healing process. • Existence: with or without clear signs, with alteration of the healing process and possible infiltrate.

Table 4: Specific assessment of the PU

8.3. GENERAL CARE OF THE PATIENT IN PU TREATMENT

Take into account that the patient with PU will have high risk of suffering new lesions; therefore all prevention measures mentioned in paragraph 7 must be applied.

If the wound does not present the signs of expected healing despite the appropriate care having been carried out, the patient should be reassessed together with their ulcer and the care plan **(evidence C)**.²

8.3.1. GENERAL CARE OF THE PATIENT IN PU TREATMENT

The patient and his carers should be involved in the planning and implementation of the care plan **(low evidence)**.¹⁶ Thus, the EPUAP guide confirms that it is desirable to teach the patient and/or caregivers about what the normal healing process is, as well as how to identify the worsening and warning signs and symptoms that must be communicated to health professionals **(evidence C++)**.²

8.3.2. ELIMINATE OR ALLEVIATE THE CAUSE

Our activities will be focused on eliminating the causes of the emergence of PU at all times and if this is not possible, to alleviate them. For this purpose it shall take into account that:

- An individual should not be positioned directly on a PU, as far as this is possible, since the pressure reduces the perfusion of damaged tissues. This measure will ensure that the ulcer does not progress towards the most serious categories **(evidence C+)**.²
- Relieve pressure under the heels with category I or II ulcers by positioning the legs on a pillow or other device. We can also choose to leave them in suspension outside the bed, avoiding fallen foot **(evidence B)**.²
- For Category III, IV and unstageable ulcers, the leg must be placed on a device that raises the heel to avoid contact with the surface of the bed and to prevent equine foot **(evidence C)**.² The use of specific devices is preferable in place of pillows.

When choosing a SEMP to eliminate or alleviate the causes that result in the appearance of this type of injury, the needs of each individual, the redistribution of pressure, immobility and inactivity, the need to control the microclimate and reduce shear, the size and weight and the number and severity shall be taken into account as well as the location of existing ulcers **(evidence C)**.²

Finally increasing activity will be taken into account, as soon as possible, as this will also be a contributing factor to eliminate or alleviate the causes of a PU forming **(evidence C)**.²

8.3.3. PREVENTION OF NEW LESIONS

The prevention of other new lesions in those patients who already suffer from some will be a priority for all the actors involved in the care of these patients: healthcare personnel and carers. Thus, the predisposition of suffering more should be considered in people with active ulcers (any category). In the same way, the possibility that an individual with an ulcer in Category I is at risk of it progressing to a category II or higher will also be taken into account (**evidence B**).²

8.3.4. NUTRITIONAL SUPPORT

A good nutritional support not only facilitates the healing of the PU, but also can prevent the emergence of new ones. Nutritional requirements tend to increase with the presence of wounds so that the contribution of nutrients must be appropriate and individualised in quantity and quality. The healing of the chronic wounds may be affected when nutritional contributions are insufficient or the status of the patient is of malnutrition.

This is why we recommend:

- To assess the nutritional status of the patient at the time of the first intervention and assess this again periodically, through the use of validated instruments such as the Mini Nutritional Assessment (MNA) (**high evidence**).¹⁶
- Assess the status of weight and its follow-up to detect significant losses (changes $\geq 5\%$ in 30 days or $\geq 10\%$ in 180 days) in people with PU (**moderate evidence**)¹⁶ (**evidence C**).²
- Assess the suitability of the total intake of nutrients (foods, fluids, oral supplements and oral/parental feeding) (**evidence C**).²
- Provide a customised calorie intake based on the general condition of the patient and the level of activity (**evidence B+**).²
- Consider a nutritional support through total enteral or parenteral nutrition when the oral intake is insufficient (**low evidence**)¹⁶ (**evidence C**).²
- Provide extra high calorie and high protein nutritional supplements to those of the usual diet in patients at risk of malnutrition and whose nutritional requirements cannot be achieved with intake (**evidence A**).²
- The patient's renal function must be assessed to ensure the suitability of a high protein intake (**evidence C**).²
- High protein supplements will be provided containing arginine, as an essential amino acid, and micronutrients in those cases of patients with PU of categories III - IV or with many ulcers when the requirements cannot be achieved with conventional supplements (**evidence B**).²
- A balanced diet will be administered containing vitamins (A, B, C, E) and minerals (zinc, magnesium, selenium...) (**evidence B**).² If the daily intake is poor or insufficient they will be provided using supplements (**evidence B**).²
- Consider the administration of extra fluids to patients who show dehydration, fever, profuse sweating, vomiting, diarrhoea, or exudate wounds (**evidence C**).²

	PROTEINS	FLUIDS	CALORIES
PU categories I and II.	1.2 - 1.5 g / kg.	35 ml / kg / day.	35 kcal / kg / day. Consider multivitamins and minerals.
PU categories III and IV.	1.5 - 2.0 g / kg.	35 - 40 ml / kg / day.	40 kcal / kg / day. Consider multivitamins and minerals.
Severe wounds. PU Category IV.	up to 3.0 g / kg*.	40 ml / kg / day.	≥ 40 kcal / kg / day. Consider multivitamins and minerals.
Multiple wounds/that do not heal. Hypoalbuminemia (27 g/l or less). Prealbumin (0.10 g/l or less). PU Category II multiple.	2.0 - 3.0 g / kg*.	40 ml / kg / day.	35 - 40 kcal / kg / day. Consider multivitamins and minerals.

*Manage these figures with caution in people of advanced age or with renal pathology²²

Table 5: Nutritional recommendations by type of wound

8.3.5. EMOTIONAL SUPPORT

Pressure ulcers pose a high emotional cost both to the person who suffers them as well as for those around them. These lesions diminish the quality of people's life, as a lot of time is taken in their care, human and economic resources. All this necessarily means changes in the lifestyles of the patient and those around them.

These changes must be faced with emotional support by the professionals responsible for the care, as the role of caregiver to which the informal carers face decreases their capacity of a family, social and even working relationship, which implies possible conflicts with those around them or loss of purchasing power.

8.3.6. PAIN CONTROL

As defined by the World Association for the Study of Pain (IASP), pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.²⁴ Many people with PU experience pain, although it is estimated that only about one third of those who suffer it can manifest due to their state of consciousness.

It is up to the professionals to take into account the assessment of pain to apply the suitable analgesia at any given time and circumstance as required by each individual.

At the same time patients and caregivers must be informed about the causes, the assessment and treatment of pain related with PU **(evidence C)**.²

In addition to the search to control continuous chronic pain, particular attention must be paid to those moments in which this can become more acute, like when dressings or postural changes are being carried out. In this way, when a cutting debridement is carried out or a sample is taken using puncture-aspiration, it is advisable that topical, oral and/or systemic analgesia be administered before performing the procedure.²⁵

It is recommended to assess periodically whether patients with PU suffer pain. An increase of this suggests a further deterioration or the possibility of infection in the wounds. The assessment of pain should be done according to the following parameters: intensity, pathophysiology (nociceptive, neuropathic), quality (continuous), appearance (unpredictable appearance).²⁶

Pain assessment in patients with PU will be done with the Visual Analogue Scale (VAS) **(evidence moderate)**¹⁶, if the condition of the patient allows it. This consists of a scale of values from 0 to 10 with “0 = no pain” to “10 = worst pain possible”. The patient should reflect their pain according to the intensity felt at that time **(annex 6: paragraph A)**.

The cognitive capacity of individuals should be taken into account in the selection of a tool for pain assessment **(evidence C)**.² The previously mentioned scale (VAS), due to its characteristics, may not be used in those patients who are unable to transmit the sensations that they suffer, as is the case of people with cognitive impairment or in patients admitted into critical units.

In patients with advanced stages of dementia scales should be used that consider behaviour like the PAINAD scale (Pain Assessment in Advanced Dementia) **(annex 7, paragraph B)**, while hospitalised patients in critical care units, those that are sedated and subjected to mechanical ventilation it is recommended that the pain be assessed using the BPS (Behavioural Pain Scale (BPS) **(annex 6: paragraph C)**.

In general the following will be taken into account:

- Assess the pain in all subjects with PU, when possible, or by examining body language in individuals with alteration of communication, and form of expression in adults and children **(moderate evidence)**¹⁶ **(evidence C)**.²
- Assess the pain related with the PU using a valid and reliable scale: CRIES (neonates up to 6 months), FLACC (2- months up to 7 years), VAS (8-99 years) **(evidence C)**.²

Some of the measures that are recommended for pain management in patients with PU are:

- Plan PU care in a coordinated manner with the administration of analgesia already scheduled for this process **(evidence C)² (low evidence)¹⁶**.
- Reduce the pain related with the PU, by keeping the wound covered and wet, through the use of a non-adherent dressing **(moderate evidence)¹⁶ (evidence B)²**.
- Select a dressing that requires the fewest number of changes causing the least pain possible **(low evidence)¹⁶ (evidence C)²**. To this end it will be necessary to consider the use of hydrocolloid dressing, hydrogels, alginates, polymer membrane foams, foam and silicone.
- Pain related to debridement must be addressed **(evidence C)²** recommending the administration of topical, oral and/or systemic analgesia before performing the invasive procedure on a patient with PU.²⁵
- Consider the use of topical anaesthetics to reduce or eliminate PU pain. (Lidocaine, Prilocaine...) **(low evidence)¹⁶ (evidence C)²**.
- Consider the use of topical opioids (diamorphine or benzydamine 3% in gel) to reduce or eliminate pain in PU **(evidence B)²**.

Therapeutic measures used to manage pain will be based on the WHO analgesic scale **(low evidence)¹⁷**.

8.4. SPECIFIC CARE OF THE PATIENT IN PU TREATMENT

Treatment strategies should be assessed continuously, based on the current status of the ulcer; with signs of healing expected in the majority of patients in the first two months of evolution of the ulcer and taking into account those factors that can alter the healing **(evidence B)²**.

The treatment of PU is based on dressings in a humid environment that provide the conditions of humidity, physiological semi-permeable temperature required, and in the preparation of the wound bed.¹⁶ The products chosen to treat the PU must have the capacity to maintain the wound bed moist, and at each change of dressing the lesion must be assessed as to whether or not to continue with the chosen product **(evidence C++)²**. The recommendations of the manufacturer must be followed for the dressings, mainly regarding the frequency of changes **(evidence C)²**.

The care plan should guide the change of dressings and include alternative plans for changing (addressed at patients and their relatives, or other professionals) in cases where there is excessive exudate, where dressings becoming unstuck... **(evidence C)²**.

The selection of dressings to be used in the treatment of this type of ulcers must be made on the basis of the following parameters **(evidence C)²**:

- Ability to maintain the wound bed moist.
- The need to manage the bacterial load.
- The nature and volume of the exudate of the wound.
- The type of tissue in the ulcer bed.
- The condition of the perilesional skin.
- According to the size, depth and location of the ulcer.
- Presence of tunnelling and/or cavitations.
- The objectives established for patient care.

8.4.1. PREPARATION OF THE WOUND BED

The preparation of the wound bed is accomplished by eliminating barriers that prevent healing taking into account four key components:

- The control of the necrotic/devitalized tissues: debridement.
- The control of the bacterial load (inflammation or infection): resetting the microbial balance.
- The control of exudate: maintaining an adequate humid environment.
- The stimulation of healing.

8.4.1.1. CLEANING THE WOUND

The ulcer should be cleaned with each change of dressing, ensuring the removal of any residue of the previous dressing (**evidence C**),² the use of drinking water or physiological saline is recommended for this (**evidence C**),² at ambient temperature for the washing of the wound surface and the surrounding skin (**high evidence**).¹⁶

Minimum mechanical force should be used to ensure that all debris and bacteria is removed (**moderate evidence**)¹⁶ (**evidence C**).² This pressure can be achieved with a syringe containing 20 to 35 cc and with an 18.5G needle of 1.2 mm diameter and that is 38-40mm long. This will be carried out from inside the ulcer bed outwards, using a spiral action (**moderate evidence**).²⁷

The use of an aseptic technique should be considered in the event that the individual, the wound or the healing process are compromised (immunodepressed patients) or when the lesion affects a sterile cavity of the body (**evidence C**).²

Assess the use of tensoactive and/or antimicrobial solutions to eliminate slough or if there is suspicion of critical colonisation and infection or confirmation of this. (**evidence C**).²

The ulcer bed that presents granulation tissue should not be dried to prevent damage to the newly formed tissue [**BP**].²⁷

8.4.1.2. DEBRIDEMENT

Debridement is generally defined as the set of mechanisms (physiological or external), aimed at the withdrawal of necrotic tissue, exudates, serous or purulent collections and /or associated foreign bodies. That is to say, all non-viable tissue and material present in the wound bed.²⁸

The presence of devitalised or necrotic tissue (non-viable), is an obstacle to the healing process because it increases the probability of infection, delays healing and hinders the assessment of the ulcer bed, which is why it should be debrided (**evidence C**).²⁶ Debridement implies the elimination of non-viable tissue and extraneous elements in the wounds.^{19, 26}

It is necessary to perform debridement of the devitalised tissue of the bed or the edge of the PU, when the patient's health condition so permits, or is in line with the objectives marked (**evidence C**).² Debridement should only be carried out when there is an adequate perfusion of the wound.

Cleanliness and the effective debridement minimises contamination and improves healing, as it eliminates the high levels of bacteria in the wounds and decreases the likelihood of infection that necrotic tissues cause (**high evidence**).²⁷ Thanks to debridement the wound bed and its depth can be properly assessed.

The professional must select the most suitable debridement method for the individual, the wound bed or the clinical context (**evidence C**).² This implies carrying out an adequate assessment, which will take into account the general condition of the patient, the chances of healing and life expectation, as well as the characteristics of the tissue to be debrided (**moderate evidence**).¹⁶ The anatomical location of the ulcer, depth, signs of infection and the presence of pain will also be taken into account, which should be addressed in any type of debridement (**evidence C**).² In the case of persons in a terminal position then priority will be given to comfort and pain control.



Figure 14: PU with abundant devitalised tissue

To be taken into account

A special situation, due to their anatomy, are the necrotic sores on the heel. One should be conservative using autolytic and/or enzymatic debridement methods when the eschar is not fully adhered and dry, and only cutting debridement will be used when there are oedematous edges, fluctuate or there is evidence of infection.¹⁹ The recommendation of evidence says that its immediate debridement is not necessary; specifying the daily monitoring of the lesion and controlling the appearance of oedematous edges, fluctuate or if there is evidence of infection (low evidence).¹⁶

A stable eschar (dry, attached, intact, without erythema or fluctuate) on the heels serves as a “natural cover (biological) of the body” and should not be eliminated.¹⁶ This scarified cover acts as a natural protective layer in an area of high risk of osteomyelitis, due to the proximity of the calcaneus bone.²⁶

In the health care practice in different areas of care, the implementation of various methods of debridement is recommended, which in many cases must be combined and maintained over time because sometimes the necrotic tissue is difficult to eliminate.¹⁶

Cutting debridement: Cutting debridement is understood as that which is done at the foot of the bed, which does not need a specific area, although it requires asepsis and the use of surgical material. In it non-viable tissue (necrotic or slough) is removed selectively and at different times, so that the wound is properly cleaned.¹⁹ This allows necrotic plaques and slough adhered to deep planes to be eliminated quickly and selectively.

The use of antiseptics is indicated in wounds that will be subjected to sharp debridement, due to the possibility of transient bacteraemia during the debridement process, which must be administered before and after the technique.²⁸ This requires knowledge and skill, but well done it produces minimum damage to healthy tissue. This technique will be limited in the case of immunocompromised patients or those with clotting disorders.¹⁹

It must be performed by planes and normally in several sessions, starting with the central zone trying to release one of the edges as soon as possible until the viable tissue is found. It will be advisable to request the consent of the patient or caregiver to carry it out, as in any invasive procedure.

TECHNIQUES TO CARRY OUT CUTTING DEBRIDEMENT *	
Cover technique	This consists of removing all the necrotic plaque with scissors or a scalpel, as if it were a lid, starting with the edges and uncovering the underlying structures until ending up in the centre with the total removal of the plaque. The tissue to debride must come off easily from the bed.
Slice technique	This consists in removing layers of necrotic tissue starting at the centre where it is least adhered to the bed, from the superficial plane to the deep plane. It is usually done in several sessions.
Square technique	This consists of carrying out longitudinal and cross cuts in the necrotic plaque, during several sessions and combined with other debridement techniques: autolytic, enzymatic... It is a conservative technique, useful when debriding hard necrotic plaques or when the underlying anatomical structures are unknown.

* Practical clinical guide to care for people with PU¹⁶

Table 6: Techniques to carry out cutting debridement

Surgical debridement: Consists of the complete removal of the necrotic and devitalized tissue carried out in a single session, in the operating room or surgery under anaesthesia or sedation. It is indicated for very thick and adhered eschars, in the presence of devitalized tissue in extensive, deep lesions, in special locations and with signs of cellulitis or sepsis, with the latter case being considered an urgent need for debridement.²⁹

The decision for surgical treatment of the PU must be based on the comprehensive assessment of the patient, with the participation of the professionals involved in their care, taking into account the level of risk of the surgical intervention and the preferences of the patient.²⁶

Enzymatic debridement: This method is based on the local application of products containing exogenous enzymes (collagenase, streptokinase, papain-urea...), which work synergistically with the endogenous enzymes, degrading the fibrin, denaturing the collagen and elastin²⁷ that will facilitate the elimination of necrotic tissue.

In our environment the most used enzyme is collagenase. Occasionally, some patients manifest discomfort after the application of these enzyme compounds, but these tend to be slight and temporary. We must take into account that collagenase can cause maceration and galling of the periwound skin; therefore it is necessary to protect it by using a barrier product (zinc paste, skin film, silicone or other) (**low evidence**).¹⁶ The use of these products will require the implementation of dressings with a minimum frequency of 24 hours, because after that time the enzyme loses activity.²⁶

CAUTION: collagenase becomes inactive in the presence of heavy metals (iodine, silver), contained in povidone-iodine, silver sulphadiazine and dressings that release silver, so their combination is not recommended.

Humidity boosts enzyme activity, so that efforts will be made for a moist environment for the wound bed.¹⁹ In the case of hard necrotic plaques making some incisions in the centre of the eschar will improve its action, which allows the ointment to come into contact with the necrotic tissue inside (Square Technique).¹⁶

Autolytic debridement: This is a natural debridement method. The phagocytes of the ulcer bed, together with macrophages and the proteolytic enzymes, are responsible for liquefying and separating the healthy tissue from non-viable tissue.

- The use of dressing products in a humid environment (hydrogel, hydrocolloid, hydrocellular, among others) can facilitate this process, which is carried out by maintaining a suitable degree of humidity through dressings that have this particularity, which facilitates the function of the phagocytic cells^{19,27} (**moderate evidence**).¹⁶
- This method is the most selective, less painful and less harmful to the surrounding healthy tissue. However it shows a slower action over time, and represents the most appropriate choice when other formulas cannot be used, and is also the best in combination with enzymatic debridement.^{16, 26}
- Its use implies choosing the most appropriate dressing as it tends to increase exudates from the wound. Their main indications are ulcers with little or no exudate.
- The most common is the use of a hydrogel with a foam (hydropolymeric, hydrocellular, hydrostatic...) or a hydrocolloid as a secondary dressing.^{19,26} Its improper use can cause maceration of the perilesional skin.²⁷

Mechanical debridement: It is not a very selective method as it is based on the removal of tissue through traumatic action mechanisms. It sometimes destroys the fragile granulation tissue and in general this is a more painful procedure.

This type of debridement includes different methods, among others the removal of the dry dressing, continuous irrigation at pressure, hydrosurgery, and dermabrasion with CO₂ laser or ultrasound.¹⁹

- Hydrosurgery is recommended in the elimination of biofilm as an intervention prior to a skin graft. This procedure requires sedation of the individual and monitoring of the subsequent bleeding.¹⁶
- The carbon dioxide laser produces a dermabrasion which could be considered as a debridement. There are tests to determine that its use can be very effective in the elimination of the biofilm and the preparation of the pre-graft bed [BP].¹⁶

Biological debridement: This method also called larval therapy, it is characterised by the use of sterile fly larvae (*Lucilia sericata*). It is appropriate and safe for the debridement of lesions of different aetiology, especially those that are difficult to approach using other procedures [BP].¹⁶ Its use is not common in our environment.¹⁹

Its action is diminished because of excess exudates, dryness, very hard necrotic plaque or even the use of hydrogels containing propylene glycol. It has no side effects, no allergic reactions, encourages the reduction of the bacterial load and also reduces smell, stimulates granulation tissue and is a quick debridement.¹⁹

The psychological aspect of its use should be taken into account by both the patient and the health care professionals.¹⁹

Osmotic debridement: Osmotic debridement is achieved through the exchange of different density fluids, through the implementation of hyperosmolar solutions or polyacrylate dressings activated with these. It is a selective method, although its main drawback is that it requires changes of dressing every 12-24 hours.¹⁶

Use mechanical, autolytic, enzymatic and/or biological debridements when there is no urgent clinical need to remove the devitalized tissue (evidence C).²

8.4.1.3. CONTROL OF THE BACTERIAL LOAD

The presence of bacteria is usual in a chronic wound. It is considered that there is an infection when these by number or virulence, damage the “host”. There will be a contamination, colonisation, critical colonisation or topical infection, local infection, spread of the infection or cellulitis and sepsis depending on the number of bacteria and their effects.

CONTAMINATION	COLONISATION
Is the presence of bacteria do not multiply. It is likely that a chronic wound is contaminated and this does not imply a delay in the healing.	This is the presence of bacteria that multiply without any reaction by the host. This situation does not imply a delay in the healing process.
CRITICAL COLONISATION	INFECTION
This is the presence of bacteria that multiply and produce a reaction in the host, showing local damage in the tissue. This situation implies a delay in the healing.	This is the presence of bacteria that multiply and invade the tissue producing a general reaction in the host. This situation implies a significant delay in the healing.

Chart 3: Stages of the bacterial load

As PUs are the result of an ischemia caused by the crushing of the tissues, they are more susceptible to the development of an infection because the tissues do not normally receive the contribution of nutrition, oxygenation, antibodies, or antibiotics if necessary. Infection is not common in categories I and II, but is in categories III, IV and in ulcers that cannot be categorised, the assessment should be intensified.

The presence of certain signs and symptoms in PUs may point to the presence of a local infection:²

- The absence of healing signs in two weeks.
- Friable granulation tissue.
- Bad smell.
- Increase of exudate.
- Changes in the appearance of the exudate (bloody or purulent).
- Increase in the necrotic tissue in the wound bed (**evidence B**).²

The existence of a possible infection is suspected if the wound has been open for a long time, if it is large in size or depth and if its likely contamination is due to its location (close to the perianal area) (**evidence C**).² In this regard it is important to prevent contamination of the wound (**evidence C**).²

Infected wounds are associated with the presence of biofilms (*), which are present in 60 % of ulcers, which can cause a state of chronic inflammation that prevents healing. The status of critical colonisation, describes wounds with a number of plactonic bacteria below 10⁵ units, forming colonies that do not allow the healing of the wound, interacting with the presence of biofilms.³⁰

In the laboratory an infection is considered from 100,000 colony forming units (CFU) (Girón Jorcano, 2009), but relates to the virulence of the pathogen germ and the resistance of the host.³¹

The presence of a biofilm will be suspected in a PU:

- When this is of a duration greater than four months.
- The absence of signs of healing in two previous months.
- Signs and symptoms of inflammation.
- And that there is no response to antimicrobial agents (**evidence C**).²

(*) Biofilms are an aggregation of bacteria and fungi that secrete a protection matrix that adheres firmly to a surface. They are highly prevalent in our environment, as it is known that they cause chronic inflammation and contribute to the development of many diseases: dental, middle ear, corneal infections related with the use of contact lenses, infections related to be wearers of therapeutic devices... the bacteria in biofilms improve its resistance to antibodies, phagocytes, antibiotics and antiseptics, in relation to bacteria in plactonic state.

Debridement must be intensified when the presence of a biofilm is suspected together with the use of antiseptics or antimicrobial dressings, in these cases, an appropriate intervention is considered for the wound to progress from an inflammatory phase to a repairing phase.

Diabetic patients, with malnutrition, decreased tissue perfusion, autoimmune diseases or immunosuppressed patients will be more susceptible to the wound being infected or colonised (**evidence B**).²

The diagnosis of infection associated with PU must be fundamentally clinical.³² In the absence of clinical signs of infection, the determination of the bacterial load is considered the indicator that determines if a wound is infected. The recommended method is to quantify the bacteria from the tissue using a biopsy or quantitative techniques (**evidence B**).² Sampling by brushing a surface only indicates the type of bacteria that colonises the wound.

In the control of the bacterial load and biofilms is essential to consider the recommendations related to cleanliness and debridement. On the other hand, whenever a patient has more than one PU, dressings will begin to be performed starting with the less contaminated and material will not be shared between them. The disinfection of hands will be carried out so as to avoid cross-infection.

Dressings impregnated with silver are products whose use should be assessed before the presence of infected PU or in the phase of critical colonisation (**evidence B**).² Their prolonged use should be avoided and their application should be suspended when the wound infection is controlled (**evidence B**).² This is due to the fact that silver can be toxic to keratinocytes and fibroblasts. It should be borne in mind that the products with silver must not be used in patients sensitive to it. If there is presence of bad smell this can be managed with carbon dressings [**BP**].¹⁶

The use of topical antibiotics should be limited in the treatment of PU, except in those situations where the benefit to the patient exceeds the risks of side effects and resistance caused by antibiotics. Short periods of treatment with silver sulphadiazine or topical metronidazole can be used in certain circumstances, for example on debrided wounds that have a bacterial load greater than 10⁵ and/or presence of beta haemolytic streptococcus, considering the sensitivity to the antimicrobial agent in question (**evidence C+**). The use of systemic antibiotics will be reserved for those patients who have clinical evidence of systemic infection, such as positive

blood cultures, cellulite, fasciitis, osteomyelitis, systemic inflammatory response syndrome or se (evidence C).²

The use of antiseptics in conjunction with debridement is indicated when there is suspicion of the presence of a biofilm and wounds that have a delayed healing (evidence C).² However their use for the control of the bacterial load must be limited in time (evidence C).² Commonly used antiseptics are:

- Povidone-iodine and slow release cadexomer iodine. The latter shall be considered in PU with moderate/high exudate (evidence C).²
- Silver compounds (including silver sulphadiazine).
- Polyhexanide and betaine.
- Chlorhexidine.

The following considerations should be borne in mind for the use of some antiseptics:

- Hydrogen peroxide (H₂O₂) is very toxic to tissues (even at low concentrations), so it should not be an antiseptic of choice. It will be contraindicated in cavitated wounds because of the risk of emphysema and air embolism.
- Products with iodine should be avoided in patients with renal failure, thyroid disorders or sensitivity to iodine.
- The use of acetic acid (C₂H₄O₂) can cause acidosis if used for long periods of time in extensive wounds.

8.4.1.4. EXUDATE CONTROL

Another of the factors to be taken into account in the procedure of dressing a PU is that of carrying out a correct management of the exudate of the ulcer bed, since the maintenance of an optimal moist environment allows cell migration and, consequently, the healing of the wound. Against this is, both excess exudate, which can macerate the perilesional skin, as well as the absence or scarcity of it that can cause the formation of crust and prevent or delay normal healing.

Dressing in a humid environment has proved to be more cost-effective and better manages exudates than dressings in a dry environment (high evidence).¹⁶

The exudate presents some characteristics of colour, consistency and odour that may vary when changes occur in the wound or in the person's body. That is why its assessment is useful to identify the condition of the wound. This will allow the most appropriate dressings to be chosen and the frequency of their changes to be established.

Faced with an increase of exudate and/or changes in the appearance of this, we shall suspect there is an infection or an increase of the bacterial load of the ulcer.

The excess of exudation can be managed with alginate dressing, hydrofibres or polyurethane foam (hidrocelullar and hidropolimeric), because they have higher absorption and evaporation capacity (moderate evidence).¹⁶ While the absence or scarcity of exudate can be managed by providing moisture with hydrogels (moderate evidence),¹⁶ which are also indicated in ulcers that are not infected and those that are in the granulation phase (evidence B).²

8.4.1.5. STIMULATION OF HEALING

Once the inflammatory phase in the healing process of the ulcer has been overcome, an appropriate humid environment must be maintained to favour the proliferative and epithelisation/remodelling phases. These phases may be altered by a deficit of growth factors, among other causes, resulting in a delay in the process. To help prevent the delay or reduce healing time, there are products or techniques such as:

- Collagen.
- Hyaluronic acid.
- Dressings with ionic load (Zinc, Manganese and Calcium).
- Protease modulator dressings.
- Platelet-derived growth factors.
- Biophysical agents: electrical stimulation, negative pressure therapy (NPT)...
- Direct contact electrical stimulation is a technique that must be taken into account to facilitate healing in recalcitrant PUs of category II as well as category III and IV (**evidence A**).²
- NPT is considered an initial complement for the treatment of deep PUs in category III and IV (**evidence B**).² It is not recommended in inadequately debrided wounds or in patients with bleeding disorders.

8.4.2 PERILESIONAL SKIN CARE

The most frequent complication in the surrounding skin to a PU is the emergence of maceration produced by an excess of moisture due to poor management of the exudate.

It is important to protect the perilesional skin to avoid or minimise the occurrence of this complication using products such as the zinc oxide creams (ZnO) or barrier films (**evidence C**).²

The use of foam dressings with silicone to avoid injuring the periulceral tissue when it is weak or friable shall be taken into account (**evidence B**).²

09 SUMMARY OF EVIDENCE RECOMMENDATIONS

EVIDENCE [E] / RECOMMENDATION [R] GOOD PRACTICE [GP]		LEVEL / GRADE
[R]	Patients who are bedridden and/or sitting must be taken into account as they have limited movement, and run the risk of developing this type of lesions.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	Patients with an ulcer of category I run the risk that the injury progresses toward a larger ulcer.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	Patients with an active PU may develop a new lesion.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	The presence of diabetes, vascular diseases, use of vasoactive drugs due to cardiovascular instability, low or high blood pressure, altered ankle-brachial index, tobacco consumption, presence of oedemas or oxygen therapy, are some of the factors that affect perfusion and oxygenation. Various researches have linked them with the development of pressure ulcers.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	If moisture is excessive, this affects the tolerance of the skin.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	The presence of a high body temperature is associated with the emergence of PU.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	Advanced age, linked to other factors increases the risk, especially in patients older than 75 years.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	Limited sensory perception reduces the capacity to respond appropriately to the problems arising from pressure on any part of the body. This type of situation occurs in states of low level of consciousness or sedation, or when there is a loss of sensation in any part of the body.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²

[E]	Haematological parameters: Some studies have provided statistical association between changes of urea and electrolytes, high C-reactive protein, lymphopenia, hypoalbuminemia and a reduction in haemoglobin, and the development of PU. These parameters can be secondary to various causes (malnutrition, blood loss during surgery, ...) affecting the reparation function, transport and thermodynamics of the skin.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	The presence of chronic diseases, surgical interventions, medical treatments, states of mental confusion among others, can increase vulnerability to develop PU, as they affect nutrition, perfusion, or moisture of the skin.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The risk will be assessed with the aforementioned tool, as soon as possible within the first eight hours after the patient's admission. The re-assessment will be carried out as regularly and frequently as the seriousness of their condition requires. It must also be reassessed if there has been any change in the status of the patient or transfer of unit.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The use of a reliable and validated instrument- like the Braden Q- to assess the PU risk in the paediatric population must be taken into account in order to facilitate a structured assessment.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The re-examination should be carried out after 8 or 24 hours, depending on the patient's situation. In the case of patients with diagnostic or therapeutic devices, the skin around and below them, must be re-examined twice a day and this should be more frequent in patients with localised or generalised signs of oedema.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Both children and adults carriers of devices, must be considered to be at risk of developing a PU.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	It is recommended to keep the skin hydrated using moisturising creams to decrease the risk of damage.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The use of hyper-oxygenated fatty acids on the risk areas is also recommended.	HIGH (GPC Valencia, 2012). ¹⁶

[R]	It is not advisable to perform massages to prevent the PU, since the capillaries can be damaged or skin is fragile. Nor should it be rubbed vigorously and whenever possible it is advisable not to support the patient on an erythema.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Avoid postures like the Fowler (over 30°) or the half laying position as long as the patient's condition permits.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Assess the skin often when using beds with the possibility of lateralisation, since the risk of injury by shearing exists when patients are lateralised.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Postural changes should be made to reduce the duration and the magnitude of the pressure on vulnerable areas of the body.	A (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	The frequency of postural changes will be determined by the tolerance of the individual's tissue, their degree of activity and mobility, their general health condition, the global objectives of the treatment and an assessment of the condition of the individual's skin.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Postural changes shall be carried out using the semi-Fowler position of 30° (maximum), or the supine and the lateral decubitus position with an inclination of 30°. These three positions can be alternated to avoid postures that increase pressure, like the Fowler of more than 30°, or the 90° lateralisation to prevent support on the trochanter.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	When the patient is in a sitting position, it is important to reposition them every 15 minutes using their arms, if they are able to carry it out independently, if this were not the case should be carried out by their carers. The time an individual spends sitting in a chair with no relief of the pressure should be limited.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	In the case of children and neonates, it is important to frequently reposition the head when they are sedated and with ventilation. This is due to the high risk of developing pressure ulcers in the occipital area.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²

[R]	The pattern of postural changes should be recorded, specifying the frequency, the position taken and the assessment of the result of the relocation regime or plan.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Choose the SEMP according to the needs of the individual, their weight and height, the redistribution of pressure, immobility and inactivity and the need to control the microclimate and reduce the shear.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	It is necessary to continue carrying out changes in posture to patients placed on a SEMP, because it is necessary to continue easing the pressure, while at the same time facilitating patient comfort. However, the frequency of repositioning can be varied due to the use of this surface.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The use of high density foam or memory foam mattresses is recommended, before those mattresses that do not have this type of foam, in all those patients whose assessment indicate they are at risk of developing a PU.	A (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	When patients with high risk cannot be repositioned manually, dynamic support surfaces must be used (mattress or mattress covers).	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	It is not recommended that mattress or mattress covers be used made from alternating air pressure formed by small cells (diameter of less than 10 cm), since their size does not guarantee the relief of the pressure.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The use of devices that raise and unload the heel completely are recommended, in such a way as to distribute the weight of the leg along the calf without exerting pressure on the Achilles tendon.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Knees in both cases should be semi bent at an angle of 5° to 10°, since the hyperextension of these could cause obstruction of the popliteal vein and predispose to a deep vein thrombosis.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	In connection with the support surfaces to prevent the PU while sitting, a seat cushion that redistributes the pressure should be used, in those patients whose mobility is limited.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²

[R]	In response to the morphology, ring or doughnut shaped devices should be avoided, due to the edges of these devices creating areas of high pressure that may damage the tissues.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	If the patient sweats a lot then the clothes must be changed frequently, including the sheets. In the same way, one must protect the skin from exposure to excessive moisture with barrier product and thus reduce the risk of injury.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Provide and promote the daily intake of fluids for the adequate hydration of patients with PU risk. This must be compatible with the comorbidity of the individual and the objectives marked. The cognitive function should also be considered, including the ability to be able to eat by themselves.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Postural changes should be recorded by specifying the frequency and the position taken, and an assessment of the results observed should be included.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[GP]	The patient, family and caregivers must be trained from the moment that this risk is detected.	(Verdú J, Tesis Doctoral, 2006). ⁴
[R]	The use of a validated scale to assess the progress of the PU is recommended.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The ulcer will be measured using the same method during the whole treatment process, in order to facilitate comparisons of the measurements over time.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The use of photography to monitor the evolution of the PU should be considered.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	If the wound does not present the signs of expected healing despite the appropriate care having been carried out, the patient should be reassessed together with the ulcer and the care plan.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The patient and his carers should be involved in the planning and implementation of the care plan.	LOW (GPC Valencia, 2012). ¹⁶

[R]	It is desirable that the patient and/or caregivers be taught about what the normal healing process is, as well as how to identify the worsening and warning signs and symptoms that must be communicated to health professionals.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	An individual should not be positioned directly on a PU, as far as this is possible, since the pressure reduces the perfusion of damaged tissues. This measure will ensure that the ulcer does not progress towards the most serious categories.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Relieve pressure on the heels in ulcers of category I or II by placing the legs on a pillow or other device. We can also choose to leave them in suspension outside the bed, to avoid fallen foot.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	For Category III, IV and unstageable ulcers, the leg must be placed on a device that raises the heel to avoid contact with the surface of the bed and to prevent equine foot.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	For Category III, IV and unstageable ulcers, the leg must be placed on a device that raises the heel to avoid contact with the surface of the bed and to prevent equine foot. The increase of the activity, as soon as possible, will also be taken into account as a contributing factor to eliminate or alleviate the causes of a PU being formed.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Assess the status of weight and its follow-up to detect significant losses (changes $\geq 5\%$ in 30 days or $\geq 10\%$ in 180 days) in people with PU.	MODERATE (GPC Valencia, 2012). ¹⁶ C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Assess the suitability of the total intake of nutrients (foods, fluids, oral supplements and oral/parental feeding).	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Once a nutritional assessment has been completed using a validated scale or quantification of the patient's intake (giving special consideration to a poor protein intake), the result obtained will provide information to determine if the patient is at risk or not. Low weight (BMI < 18.5) and the loss of this, also have to be taken into account.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²

[R]	To assess the nutritional status of the patient at the time of the first intervention and assess this again periodically, through the use of validated instruments such as the Mini Nutritional Assessment (MNA).	HIGH (GPC Valencia, 2012). ¹⁶
[R]	Provide a customised calorie intake based on the general condition of the patient and the level of activity.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Consider a nutritional support through total enteral or parenteral nutrition when the oral intake is insufficient.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Provide extra high calorie and high protein nutritional supplements to those of the usual diet in patients at risk of malnutrition and whose nutritional requirements cannot be achieved with intake.	A (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The patient's renal function must be assessed to ensure the suitability of a high protein intake.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	High protein supplements will be provided containing arginine, as an essential amino acid, and micronutrients in those cases of patients with PU of categories III - IV or with many ulcers when the requirements cannot be achieved with conventional supplements.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	A balanced diet will be administered containing vitamins (A, B, C, E) and minerals (zinc, magnesium, selenium...) If the daily intake is poor or insufficient they will be provided by means of supplements.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Consider the administration of extra fluids to patients who show dehydration, fever, profuse sweating, vomiting, diarrhoea, or exudate wounds.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	At the same time patients and caregivers must be informed about the causes, the assessment and treatment of pain related with the PU.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Pain assessment in patients with PU will be done with the Visual Analogue Scale (VAS), if the condition of the patient allows it.	MODERATE (GPC Valencia, 2012). ¹⁶

[E]	The cognitive capacity of individuals should be taken into account in the selection of a tool for pain assessment.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Assess the pain in all subjects with PU, when possible, or by examining body language in individuals with alteration of communication, and form of expression in adults and children.	MODERADA (GPC Valencia, 2012). ¹⁶ C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Assess the pain related with the PU using a valid and reliable scale: CRIES (neonates up to 6 months), FLACC (2- months up to 7 years), VAS (8-99 years).	C (GPC NPUAP-EPUAP, 2014). ²
[R]	Plan PU care in a coordinated manner with the administration of analgesia already scheduled for its process.	C (GPC NPUAP-EPUAP, 2014). ²
[R]	Reduce the pain related with the PU, by keeping the wound covered and wet, through the use of a non-adherent dressing.	MODERATE (GPC Valencia, 2012). ¹⁶ C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Select a dressing that requires the fewest changes causing the least pain possible.	LOW (GPC Valencia, 2012). ¹⁶ C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Pain related with debridement must be addressed.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Consider the use of topical anaesthetics to reduce or eliminate PU pain (lidocaine, prilocaine...)	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Consider the use of topical opioids (diamorphine or benzydamine 3 % in gel) to reduce or eliminate pain in PU.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Therapeutic measures used to manage pain will be based on the WHO analgesic scale.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²

[R]	Treatment strategies should be assessed continuously, based on the current status of the ulcer; with signs of healing expected in the majority of patients in the first two months of evolution of the ulcer and taking into account those factors that can alter the healing.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Products chosen for the treatment of the PU must have the capacity to maintain the wound bed moist, and the lesion will be assessed at each change of dressing to see whether or not to continue with the chosen product.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The recommendations of the manufacturer must be followed for the dressings, mainly regarding the frequency of changes.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The care plan should guide the change of dressings and include alternative plans for changing (addressed at patients and their relatives, or other professionals) in cases where there is excessive exudate, where dressings becoming unstuck...	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	<p>The selection of dressings to be used in the treatment of this type of ulcers must be made on the basis of the following parameters:</p> <ul style="list-style-type: none"> • Ability to maintain the wound bed moist • The need to manage the bacterial load • The nature and volume of the exudate of the wound • The type of tissue in the ulcer bed • The condition of the perilesional skin • According to the size, depth and location of the ulcer • Presence of tunnelling and/or cavitations • The objectives established for patient care 	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	The ulcer should be cleaned with each change of dressing, ensuring the withdrawal of the remains of the previous dressing, the use of drinking water or physiological saline is recommended for this, at ambient temperature to wash the wound surface and the surrounding skin.	ALTA (GPC Valencia, 2012). ¹⁶ C (GPC NPUAP-EPUAP, 2014). ²
[R]	Minimum mechanical force should be used to ensure that all debris and bacteria is removed. This pressure can be achieved with a 20 to 35 cc syringe with a needle or catheter of 19 mm diameter. This will be carried out from inside the ulcer bed outwards, using a spiral action.	MODERATE (GPC Valencia, 2012). ¹⁶ C (GPC NPUAP-EPUAP, 2014). ²

[R]	The use of an aseptic technique should be considered in the event that the individual, the wound or the healing process are compromised (immunodepressed patients) or when the lesion affects a sterile cavity of the body.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	Assess the use of tensoactive and/or antimicrobial solutions to eliminate slough or before the suspicion of critical colonisation and infection or confirmation of this.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[GP]	The ulcer bed that presents granulation tissue should not be dried to prevent damage to the newly formed tissue.	(GNEAUPP, 2011). ²²
[E]	The presence of devitalised or necrotic tissue (non-viable), is an obstacle to the healing process because it increases the probability of infection, delays healing and hinders the assessment of the ulcer bed, which is why it should be debrided.	C (GPC Balears, 2008). ²⁶
[R]	It is necessary to perform debridement of the devitalised tissue of the bed or the edge of the PU, when the patient's health condition so permits, or is in line with the objectives marked.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	Cleanliness and the effective debridement minimises contamination and improves healing, as it eliminates the high levels of bacteria in the wounds and decreases the likelihood of infection that necrotic tissues cause.	HIGH (GPC SAS, 2007). ²⁷
[R]	The professional must select the most suitable debridement method for the individual, the wound bed or the clinical context.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	This implies carrying out an adequate assessment, which will take into account the general condition of the patient, the chances of healing and life expectation, as well as the characteristics of the tissue to be debride. Anatomical location of the ulcer, depth, signs of infection and the presence of pain will also be taken into account.	MODERATE (GPC Valencia, 2012). ¹⁶ C (GPC NPUAP-EPUAP, 2014). ²
[E]	In the case of necrotic plaques located on heel that do not present oedema, erythema, fluctuate or drainage; immediate debridement is not necessary; requiring daily monitoring of the lesion and controlling the appearance of oedematous edges, fluctuate or evidence of infection.	LOW (GPC Valencia, 2012). ¹⁶

[R]	We must take into account that the collagenase can cause maceration and galling of the periulcer skin; therefore it is necessary to protect it by using a barrier product (zinc paste, skin film, silicone or other).	LOW (GPC Valencia, 2012). ¹⁶
[R]	The use of dressing products in humid environment (hydrogel, hydrocolloid, hidrocellular, among others) can facilitate this process, which is carried out by maintaining a suitable degree of humidity through dressings that have this particularity, which facilitates the function of the phagocytic cells.	MODERATE (GPC Valencia, 2012). ¹⁶
[GP]	The carbon dioxide laser produces a dermabrasion which could be considered as a debridement. There are tests to determine that its use can be very effective in the elimination of the biofilm and the preparation of the pre-graft bed.	(GPC Valencia, 2012). ¹⁶
[GP]	Larval therapy is a non-surgical appropriate and safe alternative for the debridement of lesions of different aetiology, especially those that are difficult to approach using other procedures.	(GPC Valencia, 2012). ¹⁶
[R]	Use mechanical, autolytic, enzymatic debridement and/or biological methods when there is no urgent clinical need to remove the devitalised tissue.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	The presence of certain signs and symptoms in PUs may point to the presence of a local infection: <ul style="list-style-type: none"> • The absence of signs of healing in two weeks • Friable granulation tissue • Bad smell • Increase of exudate • Changes in the appearance of exudate (bloody or purulent) • Increase in the necrotic tissue in the wound bed 	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	The existence of a possible infection is suspected if the wound has been open for a long time, if it is large in size or depth and if its likely contamination is due to its location (close to the perianal area). In this regard it is important to prevent contamination of the wound.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²

[E]	<p>The presence of a biofilm will be suspected in a PU:</p> <ul style="list-style-type: none"> • When this is of a duration greater than four months • The absence of signs of healing in two previous months • Signs and symptoms of inflammation • And that there is no response to antimicrobial agents 	<p style="text-align: center;">C</p> <p>(GPC NPUAP-EPUAP-PPPIA, 2014).²</p>
[E]	<p>Diabetic patients, with malnutrition, decreased tissue perfusion, autoimmune diseases or immunosuppressed patients will be more susceptible to the wound being infected or colonised.</p>	<p style="text-align: center;">B</p> <p>(GPC NPUAP-EPUAP-PPPIA, 2014).²</p>
[E]	<p>The recommended way is to quantify the bacteria from the tissue using a biopsy or quantitative techniques.</p>	<p style="text-align: center;">B</p> <p>(GPC NPUAP-EPUAP-PPPIA, 2014).²</p>
[E]	<p>Dressings impregnated with silver are products whose use should be assessed before the presence of infected PU or in the phase of critical colonisation.</p>	<p style="text-align: center;">B</p> <p>(GPC NPUAP-EPUAP-PPPIA, 2014).²</p>
[E]	<p>Their prolonged use should be avoided and their application should be suspended when the wound infection is controlled.</p>	<p style="text-align: center;">C</p> <p>(GPC NPUAP-EPUAP-PPPIA, 2014).²</p>
[GP]	<p>It should be borne in mind that the products with silver must not be used in patients sensitive to it. If there is presence of bad smell this can be managed with carbon dressings.</p>	<p>(GPC Valencia, 2012).¹⁶</p>
[R]	<p>The use of systemic antibiotic will be reserved for those patients who have clinical evidence of systemic infection, such as positive blood cultures, cellulite, fasciitis, osteomyelitis, systemic inflammatory response syndrome or sepsis.</p>	<p style="text-align: center;">C</p> <p>(GPC NPUAP-EPUAP-PPPIA, 2014).²</p>
[R]	<p>The use of antiseptics in conjunction with the debridement is indicated when there is suspicion of the presence of a biofilm and wounds that have a delayed healing. However their use for the control of the bacterial load must be limited in time.</p>	<p style="text-align: center;">C</p> <p>(GPC NPUAP-EPUAP-PPPIA, 2014).²</p>
[E]	<p>Commonly used antiseptics are: Povidone-iodine and slow release cadexomer iodine. The latter shall be considered in PU with moderate/high exudate.</p>	<p style="text-align: center;">C</p> <p>(GPC NPUAP-EPUAP-PPPIA, 2014).²</p>

[E]	Dressing in a humid environment has proved to be more cost-effective and better manages the exudates than dressings in a dry environment.	HIGH (GPC Valencia, 2012). ¹⁶
[E]	The excess of exudate can be managed with alginate dressing, hydrofibres or polyurethane foam (hidrocelullar and hydropolimeric), because they have higher absorption and evaporation capacity. While the absence or scarcity of exudate can be managed by providing moisture with hydrogels.	MODERATE (GPC Valencia, 2012). ¹⁶
[E]	Hydrogels are indicated in non-infected ulcers and those that are in the granulation phase.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	Direct contact electrical stimulation is a technique that must be taken into account to facilitate healing in recalcitrant PUs of category II as well as category III and IV.	A (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	PNT is considered as an initial complement for the treatment of deep Pus in category III and IV.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[R]	It is important to protect the perilesional skin to avoid or minimise the occurrence of this complication using products such as the zinc oxide creams (ZnO) or barrier films.	C (GPC NPUAP-EPUAP-PPPIA, 2014). ²
[E]	The use of foam dressings with silicone to avoid injuring the periulceral tissue when it is weak or friable shall be taken into account.	B (GPC NPUAP-EPUAP-PPPIA, 2014). ²

10 LITERATURE

- 1 SHEA J. D. *Pressure sores: classification and management*. Clin Orthop Relat Res. 1975 Oct;(112): 89–100.
- 2 National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. *Prevention and Treatment of Pressure Ulcers: Quick Reference Guide*. Emily Haesler (Ed.). Cambridge Media: Perth Australia; 2014 [acceso 14 de julio de 2016]. Disponible en: <http://gneaupp.info/npuap-epuap-pppia-quick-reference-guide-2014/>
- 3 GARCÍA FERNÁNDEZ F. P., SOLDEVILLA AGREDA J. J., PANCORBO HIDALGO P. L., VERDÚ SORIANO J., LÓPEZ CASANOVA P., RODRÍGUEZ PALMA M. *Clasificación-Categorización de las Lesiones Relacionadas con la Dependencia*. Serie Documentos Técnicos GNEAUPP nº II. Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas. 2ª ed. Logroño: 2014 [acceso 14 de julio de 2016]. p. 10. Disponible en: <http://gneaupp-1fb3.kxcdn.com/wp-content/uploads/2014/12/clasificacion-categorizacion-de-las-lesiones-relacionadas-con-la-dependencia-segunda-edicion.pdf>
- 4 VERDÚ SORIANO J. *Epidemiología, prevención y tratamiento de las úlceras por presión*. [Tesis doctoral]. Alicante: Universidad de Alicante; 2006. [acceso 14 de julio de 2016]. Disponible en: <http://rua.ua.es/dspace/handle/10045/13276>
- 5 Agencia de Calidad del SNS. *Plan de Calidad para el Sistema Nacional de Salud 2007*. Madrid: Ministerio de Sanidad y Consumo; 2006 [acceso 14 de julio de 2016]. Disponible en: <http://www.msc.es/organizacion/sns/planCalidadSNS/docs/planCalidad2007.pdf>
- 6 BARRASA VILLAR J. I., ENRÍQUEZ MARTÍN N., ABAD DíEZ J. M., VALDERRAMA RODRÍGUEZ M., PÉREZ PÉREZ A., REVILLA LÓPEZ C., ESTUPIÑÁN ROMERO F.R. *La calidad de la atención sanitaria. Indicadores de efectividad clínica*. Sociedad española de calidad asistencial. 2013 [acceso 14 julio de 2016]. Disponible en: http://calidadasistencial.es/wp-seca/wp-content/uploads/2015/02/indicadores_efectividad_clinica2.pdf
- 7 SOLDEVILLA AGREDA J. J., TORRA I BOU J. E., POSNETT J., VERDÚ SORIANO J., SAN MIGUEL L., MAYAN SANTOS J. M. *Una aproximación al impacto del coste económico del tratamiento de las úlceras por presión en España*. Gerokomos. 2007; 18(4): 201-210.
- 8 GNEAUPP [página Web] *Logroño: Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas*. 2010 [acceso 14 de julio de 2016]. Agencia Europa Press. El coste del tratamiento de las úlceras por presión supera los 600 millones de euros cada año. Disponible en: <http://gneaupp.info/el-coste-del-tratamiento-de-las-ulceras-por-presion-supera-los-600-millones-de-euros-cada-ano/>
- 9 PANCORBO-HIDALGO P. L., GARCÍA-FERNÁNDEZ F. P., TORRA I BOU J. E., VERDÚ SORIANO J., SOLDEVILLA-AGREDA J. J. *Epidemiología de las úlceras por presión en España en 2013: 4ª Estudio Nacional de Prevalencia*. Gerokomos. 2014 [acceso 14 de julio de 2016]; 25 (4): 162-70. Disponible en: https://rua.ua.es/dspace/bitstream/10045/44625/1/2014_Pancorbo_etal_Gerokomos.pdf
- 10 ARANAZ J. M., editor. *Estudio Nacional de Efectos Adversos Ligados a la Hospitalización*. ENEAS 2005. Madrid: Ministerio de Sanidad y Consumo; 2006.
- 11 RUMBO PRIETO J. M., ARANTÓN AREOSA L. , ROMERO-MARTÍN M., GARCÍA COLLADO F., RAMÍREZ PIZANO A. *Sucesos Adversos Relacionados con las Úlceras por Presión: ¿Un Problema Evitable?*. Enferm Dermatol. 2010 [acceso 14 de julio de 2016]; 4(11):21-6. Disponible en: <https://dialnet.unirioja.es/servlet/articulo?codigo=4293918>

- 12 Agencia de Calidad del SNS. *Estudio APEAS. Estudio sobre la Seguridad de los Pacientes en Atención Primaria de Salud*. Madrid: Ministerio de Sanidad y Consumo; 2008 [acceso 14 de julio de 2016]. Disponible en: http://www.msssi.gob.es/organizacion/sns/planCalidadSNS/docs/estudio_apeas.pdf
- 13 Agencia de Calidad del SNS. *Estudio EARCAS: eventos adversos en residencias y centros asistenciales sociosanitarios*. Madrid: Ministerio de Sanidad, Política Social e Igualdad; 2011 [acceso 14 de julio de 2016]. Disponible en: <http://www.msssi.gob.es/organizacion/sns/planCalidadSNS/docs/EARCAS.pdf>
- 14 RUMBO PRIETO J. M., GÓMEZ COIDURAS M. *Efectos adversos relacionados con úlceras por presión en la atención socio-sanitaria*. *Enferm Dermatol*. 2012; 6(17):50-1. [acceso 14 de julio de 2016]. Disponible en: <https://dialnet.unirioja.es/servlet/articulo?codigo=4175798>
- 15 RODRÍGUEZ-PALMA M., LÓPEZ-CASANOVA P., / GARCÍA-MOLINA P., IBARS-MONCASI P. *Superficies especiales para el manejo de la presión en prevención y tratamiento de las úlceras por presión*. Serie Documentos Técnicos GNEAUPP n.º XIII [Internet]. Logroño. Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas; 2011 [acceso 14 de julio de 2016]. Disponible en: <http://gneaupp.info/superficies-especiales-para-el-manejo-de-la-presion/>
- 16 AVILÉS MARTÍNEZ M. J., SÁNCHEZ LORENTE M. M., coordinadores. *Guía práctica clínica para el cuidado de las personas con úlceras por presión o con riesgo de padecerlas*. [Internet]. Valencia: Consellería de Sanitat; 2012 [acceso 14 de julio de 2016]. Disponible en : http://www.guiasalud.es/GPC/GPC_520_Ulceras_por_presion_compl.pdf
- 17 Comité de Expertos de la OMS sobre el estado físico. *El estado físico: uso e interpretación de la antropometría*. Serie de informes técnicos, 854. Ginebra (Suiza): Organización Mundial de la Salud; 1995 [acceso 14 de julio de 2016]. Disponible en : http://apps.who.int/iris/bitstream/10665/42132/1/WHO_TRS_854_spa.pdf
- 18 PERRY D., BORCHERT K., BURKE S., CHICK K., JOHNSON K., KRAFT W., PATEL B., THOMPSON S. *Pressure Ulcer Prevention and Treatment Protocol*. [Internet]. Bloomington, MN: Institute For Clinical Systems Improvement; 2012 [acceso 14 de julio de 2016]. Disponible en: https://www.icsi.org/_asset/6t7kxy/PressureUlcer.pdf
- 19 DELGADO FERNÁNDEZ R, PÉREZ VÁZQUEZ A, RODRÍGUEZ IGLESIAS FJ, CARREGAL RAÑO L, GONZÁLEZ GUTIÉRREZ-SOLANA R., SOUTO FERNÁNDEZ E. et al. *Manual de prevención y tratamiento de úlceras por presión*. [Internet]. Santiago de Compostela: Consellería de Sanidade, Servizo Galego de Saúde; 2005 [acceso 14 de julio de 2016]. Disponible en: https://www.sergas.es/Docs/xap_pontevedra/formacion_e_docencia/Manual_ulceras.pdf
- 20 PANCORBO HIDALGO P. L., GARCÍA FERNÁNDEZ F. P., SOLDEVILLA AGREDA J. J., BLASCO GARCÍA C. *Escalas e instrumentos de valoración del riesgo de desarrollar úlceras por presión*. [Internet]. Logroño: Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas; 2009 [acceso 14 de julio de 2016]. Disponible en: http://gneaupp.info/wp-content/uploads/2014/12/19_pdf.pdf
- 21 GARCÍA FERNÁNDEZ F. P., IBARS MONCASI P., MARTÍNEZ CUERVO F., PERDOMO PÉREZ E., RODRÍGUEZ PALMA M., RUEDA LÓPEZ J. et al *Incontinencia y úlceras por presión*. [Internet]. Madrid: Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas; 2006 [acceso 14 de julio de 2016]. Disponible en: http://gneaupp-1fb3.kxcdn.com/wp-content/uploads/2014/12/18_pdf.pdf
- 22 VERDÚ J., PERDOMO E. *Nutrición y Heridas Crónicas*. Serie Documentos Técnicos GNEAUPP nº XII. Logroño: Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas; 2011 [acceso 14 de julio de 2016]. Disponible en: http://gneaupp.info/wp-content/uploads/2014/12/59_pdf1.pdf
- 23 RESTREPO MEDRANO J. C. *Instrumentos de monitorización clínica y de medida de la cicatrización*

- en úlceras por presión (UPP) y úlceras de la extremidad inferior (UEI). Desarrollo y validación de un índice de medida.* [Tesis doctoral en Internet]. Alicante: Universidad de Alicante; 2010 [acceso 14 de julio de 2016]. Disponible en : http://gneaupp-1fb3.kxcdn.com/wp-content/uploads/2014/12/40_pdf.pdf
- 24 International Association for the Study of Pain [Sede Web]. [Acceso 14 de julio de 2016]. Disponible en: <http://www.iasp-pain.org/>
 - 25 BRAVO PÉREZ M., DONO DÍAZ M. A., FERRO IGLESIAS V., MAGARIÑOS LOSADA M. M., CARRERA J. M., MIRANDA FILLOY J. A., NÚÑEZ ÁLVAREZ J. L., RODRÍGUEZ LEDO P., VÁZQUEZ SEIJAS E. *Abordaje multidisciplinar del dolor crónico.* Lugo: Xerencia de Atención Primaria, Grupo de Trabajo de Dolor Crónico; 2012.
 - 26 BAENA PANADERO M. T. (directora) *Prevención y tratamiento de las úlceras por presión.* [Internet]. Palma de Mallorca: Consellería de Salut i Consum, Servei de Salut de les Illes Balears; 2007 [acceso 14 de julio de 2016] . Disponible en: http://www.cruzroja.es/centros_sanitarios/Palma/img/pdf/PTUP.pdf
 - 27 GARCÍA FERNÁNDEZ F. P., MONTALVO CABRERIZO M., GARCÍA GUERRERO A., PANCORBO HIDALGO P. L., GARCÍA PAVÓN F., GONZÁLEZ JIMÉNEZ F., BRIONES IZQUIERDO O., ARBOLEDAS BELLÓN J., IGLESIAS PARRA M. R. *Guía de práctica clínica para la prevención y el tratamiento de las úlceras por presión.* Sevilla: Servicio Andaluz de Salud, Consejería de Salud; 2007 [acceso 14 de julio de 2016]. Disponible en: <http://www.juntadeandalucia.es/servicioandaluzdesalud/library/plantillas/externa.asp?pag=../publicaciones/datos/283/pdf/Guiacuidados.pdf>
 - 28 GARCÍA FERNÁNDEZ F. P., MARTÍNEZ CUERVO F., PANCORBO HIDALGO P. L., RUEDA LÓPEZ J., SANTAMARÍA ANDRÉS E., SOLDEVILLA AGREDA J. J., VERDÚ SORIANO J. *Desbridamiento de úlceras por presión y otras heridas crónicas.* Documento técnico [Internet]. Segovia: Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas; 2005 [acceso 14 de julio de 2016]. Disponible en: <http://gneaupp-1fb3.kxcdn.com/wp-content/uploads/2014/12/desbridamiento-de-ulceras-por-presion-y-otras-heridas-cronicas.pdf>
 - 29 National Clinical Guideline Centre (UK). *The Prevention and Management of Pressure Ulcers in Primary and Secondary Care.* London: National Institute for Health and Care Excellence (UK); 2014.
 - 30 PHILLIPS P. L., WOLCOTT R. D., FLETCHER J., SCHULTZ G. S. *Biofilms Made Easy.* *Wounds International*[internet]. 2010 [acceso 14 de julio de 2016]; 1(3): Disponible en: <http://www.woundsinternational.com/made-easys/view/biofilms-made-easy>
 - 31 VILA IGLESIAS I, CASTRO PARDO J. *Principios básicos en el tratamiento de las heridas crónicas.* En: RUMBO PRIETO J. M., coordinador. *Cuidados y registros de enfermería en la prevención y tratamiento del deterioro de la integridad cutánea y tisular.* Madrid: DAE; 2011. p. 215-231.
 - 32 *Normas básicas para la obtención de una muestra de exudado de una úlcera por presión y otras heridas crónicas.* [s.l.]: Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas; [s.d.] [acceso 14 de julio de 2016]. Disponible en: <http://gneaupp-1fb3.kxcdn.com/wp-content/uploads/2014/12/normas-basicas-para-la-obtencion-de-una-muestra-de-exudado-de-una-ulcera-por-presion-y-otras-heridas-cronicas.pdf>
 - 33 ARANTÓN AREOSA L., BERMEJO M., MANZANERO E., SALVADOR M. J., SEGOVIA T. *Guía práctica ilustrada. Úlceras por presión. Prevención y tratamiento.* Barcelona: Ediciones Mayo; 2010.
 - 34 TOMÉ ORTEGA M. J. *Abordaje holístico del paciente con riesgo de deterioro de la integridad cutánea.* En: RUMBO PRIETO J. M., coordinador. *Cuidados y registros de enfermería en la prevención y tratamiento del deterioro de la integridad cutánea y tisular.* Madrid: DAE; 2011. p. 91-122
 - 35 QUESADA C, IRURETAGOYENA M. L., GONZÁLEZ R. M., HERNÁNDEZ J. M., RUIZ DE OCENDA M. J., GARITANO B. et al. *Validación de una escala de valoración del riesgo de úlceras por presión en niños hospitalizados.* Proyecto de investigación comisionada. Vitoria-Gasteiz:

Departamento de Sanidad y Consumo. Gobierno Vasco; 2009 [acceso 14 de julio de 2016]. Disponible en: http://www.osakidetza.euskadi.eus/contenidos/informacion/2009_osteba_publicacion/es_def/adjuntos/D_09_08.%20%C3%9A%20Alceras%20por%20presi%C3%B3n%20en%20ni%C3%B1os.pdf

36. SANESTEBAN HERMIDA Y., MARTÍNEZ VÁZQUEZ A. S., MOURELO FARIÑA M., GALEIRAS VÁZQUEZ R., GIMÉNEZ MOOLHUYZEN E., SEOANE PILLADO T., SEBIO GARCÍA R., MARTÍN GARCÍA M. M. *Limitación funcional del hombro en el paciente pronado en la unidad de cuidados intensivos*. 48 Congreso SEPAR; 5-8 junio 2015; Gran Canaria.
37. WARDEN V, HURLEY A. C., VOLICER L. *Development and psychometric evaluation of the Pain Assessment in Advanced Dementia (PAINAD) scale*. J Am Med Dir Assoc. 2003 Jan-Feb;4(1):9-15. PubMed PMID: 12807591
38. PAYEN J. F., BRU O., BOSSON J. L., LAGRASTA A., NOVEL E., DESCHAUX I., LAVAGNE P., JACQUOT C. *Assessing pain in critically ill sedated patients by using a behavioral pain scale*. Crit Care Med. 2001;29(12):2258-63



11 | ANNEXES

ANNEX 1 ASSESSMENT OF THE ERYTHEMA

Skin subjected to pressure pales due to the reduction of the blood flow which causes inadequate oxygenation (ischemia). If ischemia was short and the flow is recovered, once the pressure has been relieved, the skin quickly becomes red due to a physiological response called reactive hyperaemia and the skin colour becomes normal in a short period of time.

When the pressure is greater than the capillary pressure for a sufficient enough time to cause harm, this produces a local ischemia where there will be signs such as erythema, oedema or erosion or ulcer. Non-blanchable erythema is an initial indicator of tissue damage, therefore it is very important to differentiate it prematurely from a hyperaemia (which pales) so as to intervene as soon as possible.

FINGER PRESSURE METHOD: If the reddened area whitens when you apply a gentle pressure with the finger this means that the microcirculation remains intact, therefore there are no signs of tissue damage (It is not a category I PU).



Figure 15: UPP with abundant devitalized tissue



Figure 16: Transparent pressure disc

A transparent pressure disc makes it much easier to observe if the reddened area pales or not when applying pressure and thus differentiate the category I PU from reactive erythemas.²⁰

ANNEX 2

BRADEN-BERGSTROM SCALE TO PREDICT PRESSURE ULCER RISK

Scale for adults published in 1987 by Braden and Bergstrom. This is the scale with the most validation studies, a total of 37 and at different care levels. According to these works, the average sensitivity is situated in 74 %, specificity in 69 %, positive predictive value in 43 % and negative in 90 %³³ (Arantón Areosa, 2010). It is easy to use and presents clear and defined concepts.

The conceptual diagram includes the principal factors involved in the development of a PU. The first three factors relate to aspects of intensity and duration of the pressure: decreased mobility, activity, sensory perception; while the others are related to the tolerance of the tissues, describing the extrinsic factors (increased humidity, friction and shear) and intrinsic factors (nutrition, increased age, and low arteriolar pressure).

From this diagram, the authors of the scale described six items: sensory perception, exposure to moisture, physical activity, mobility, nutrition, rubbing and danger of skin lesions; with a clear definition of what should be interpreted in each one of them.³⁴

Scoring range between 6 and 23.

- **Low risk:** range of 15-16 if the patient is younger than 75 years; range of 15-18 if the patient is older than or equal to 75 years.
- **Moderate risk:** age of 13-14.
- **High risk:** < of 12.

BRADEN-BERGSTROM SCALE FOR PREDICTION OF THE RISK OF PRESSURE ULCERS				
	1	2	3	4
SENSORY PERCEPTION Ability to react to discomfort related to pressure	Completely Limited As the level of consciousness decreases or when sitting, the patient does not react to painful stimuli (complaining, trembling or gripping) or limited capacity to feel most of the body.	Very limited Reacts only to painful stimuli. Cannot communicate their malaise, except through cries or agitation or has a sensory deficit that limits the ability to perceive pain or discomfort in more than half of the body.	Slightly limited Reacts to verbal orders, but cannot always communicate their discomfort or the need that they need to have their position changed or display any sensory difficulty that limits their ability to feel pain or discomfort, in at least one limb.	No limitation Responds to verbal orders. Presents no sensory deficit that can limit their ability to express or feel pain or discomfort.
EXPOSURE TO MOISTURE Level of exposure of the skin to moisture	Constantly moist The skin is constantly exposed to moisture by sweating, urine, etc. moisture is detected whenever the patient is moved or turned.	Often moist The skin is often, but not always, wet. The bedding has to be changed, at least once each shift.	Occasionally moist The skin is occasionally moist and requires an additional change of bed linen, approximately once a day.	Rarely moist The skin is generally dry. The bed linen is changed according to the intervals fixed for changes in routine.
ACTIVITY Level of physical activity	Bedridden Patient constantly bedridden.	In a chair Patient who cannot walk or has very limited walking. Cannot support their own weight and/or needs help to get on a chair or a wheelchair.	Occasionally walks Occasionally walks, with or without aid, during the day, but for very short distances. During the greater part of day in bed or in a wheelchair.	Frequently walks Walks outside the room at least twice a day and within the room at least two hours during walking hours.
MOBILITY Ability to change and to control the position of the body	Completely immobile Cannot make any change in the position of the body or of a limb without aid.	Very limited Occasionally makes slight changes of position of the body or of the limbs, but is not able to make frequent changes or significant ones alone.	Slightly limited Often makes slight changes in the position of the body or of the limbs on their own.	No limitation Often makes important changes of position without help.
NUTRITION Usual pattern of food intake	Very poor Never eats a full meal. Rarely eats more than a third of any food that is offered. Eats two servings or less with protein content (meat or dairy products). Drinks few liquids. Does not take dietary liquid supplements or is fasting and /or on a liquid diet or a drip for more than five days.	Probably inadequate Rarely eats a full meal and usually eats only half the food that is offered. The protein ingestion includes only three servings of meat or dairy products per day. Occasionally, takes a dietary supplement or receives less than the optimal amount of a liquid diet or by nasogastric tube.	Adequate Eats more than half of most meals. Eats a total of four servings a day of protein (meat or dairy products), occasionally can reject a meal but will take a dietary supplement if offered or receive nutrition by nasogastric tube or parenterally, covering the majority of their nutritional needs.	Excellent Eats the majority of every meal. Never refuses a meal. Usually eats a total of four or more servings of meat and/or dairy products. Occasionally eats between hours. Does not require dietary supplements.
RUBBING AND DANGER OF LESIONS	Problema Requires moderate and maximum assistance to be moved. It is impossible to lift completely without there being a slipping between the sheets. Often slips down in bed or in the chair and requires frequent repositioning with maximum assistance. The existence of spasticity, muscle contraction or agitation produces an almost constant friction.	Problema potencial Moves very weakly or requires minimum assistance. Whilst moving, the skin probably rubs against part of the sheets, hip, fastening systems or other objects. Most of the time maintains a relatively good position in the chair or in the bed, though occasionally can slip down.	Non existe problema aparente Moves on the bed and in the chair with independence and has sufficient muscular strength to be completely lifted when moved. Maintains a good position in bed or in the chair at all times.	

Table 7. Braden-Bergstrom scale for prediction of the risk of pressure ulcers

ANNEX 3

BRADEN Q SCALE

The Braden Q Scale (© Quigley S & Curley M, 1996) was created from the Braden Scale (adult) and developed for the identification of the risk of developing pressure ulcers in critical children of between 21 days and 8 years.

With seven subscales (mobility, activity, sensory perception, humidity, friction and shear, nutrition, tissue perfusion and oxygenation) mutually exclusive with a score of 1 to 4, a score equal to or less than 16 indicates a risk of developing PU.

The Braden Q scale has been validated in its version in Spanish, proving to be an instrument that is:

- Valid and reliable to assess the risk of developing PU in hospitalised children of 2 to 14 years old, both critical and non-critical. Its use is recommended in these patients.
- Its use is recommended in children between 1 month and 14 years until other validated scales in this age group or the results of new research are available.
- Not reliable for those under 1 month.

BRADEN Q SCALE					
	Intensity and duration of the pressure				PTOS
MOBILITY Ability to change and to control the position of the body	1.- Completely immobile: Does not carry out any movement with the body or limbs without help.	2.- Very limited: Occasionally makes slight changes of position of the body or of the limbs, but is not able to make frequent changes or significant ones without help.	3.- Slightly limited: Makes frequent although slight changes in the position of the body or of the limbs without help.	4.- No limitations: Performs important and frequent changes of position without assistance.	
ACTIVITY Level of physical activity					
	1.- Bedridden: Limited to the bed.	2.- In a chair: Ability to walk severely limited or non-existent. Cannot support their own weight and/or need help to sit on a chair or a wheelchair.	3.- Walks occasionally: Walks occasionally during the day, but very short distances, with or without help. Spends the majority of each shift in bed or in the chair.	4. - All patients too young to walk or walk frequently. Walks outside the room at least twice a day and within the room at least once every two hours during walking hours.	
SENSORY PERCEPTION Ability to respond appropriately, according to their level of development, the discomfort associated with the pressure	1.- Completely limited: Does not respond to painful stimuli (does not groan, shudder or grab) due to a low level of consciousness or sedation. Or limited ability to feel pain in the majority of the body.	2.- Very limited: Responds only to painful stimuli. Inability to communicate malaise, except groaning or showing concern. Or has some sensory alteration that limits the ability to feel pain or discomfort in more than half of the body.	3.- Slightly limited: Responds to verbal orders, but cannot always communicate discomfort or the need to be changed from position. Or has some sensory alteration that limits the ability to feel pain or discomfort in one or two limbs.	4.- No limitations: Responds to verbal orders. Has no sensory alteration that limits their ability to feel or communicate pain or discomfort.	
Tolerance of the skin and the support structure					
MOISTURE Level of exposure of the skin to moisture	1.- Skin constantly moist: The skin is maintained moist almost permanently due to perspiration, urine, drainage, etc. The moisture is detected each time the patient is turned or moved.	2.- Skin very moist: The skin is often, but not always, moist. Bed linen must be changed at least every 8 hours.	3.- Skin occasionally moist: The skin is occasionally moist; bed linen needs to be changed every 12 hours.	4.- Skin rarely moist: The skin is almost always dry. Diapers need to be changed routinely; bed linen only must be changed every 24 hours.	
FRICION AND SHEAR Friction: occurs when the skin is moved against the supporting surface Shear: occurs when the skin and the adjacent bone surface rub against each other	1.- Significant problem: The spasticity, muscle contraction, itching or agitation will lead to an almost constant movement and friction.	2.- Problem: Requires from moderate to maximum help to move. It is impossible to lift completely without causing rubbing between the sheets. Frequently slides down in bed or in the chair, needing to be repositioned with maximum help.	3.- Potential problem: Moves weakly or needs minimum aid. As they move, it is possible that the skin may rub in some way with the sheets, the chair or other devices. Most of the time maintains a relatively good position in the chair or in the bed, though occasionally can slip down.	4.- Without apparent problem: It is possible to lift completely during a change of position. Moves independently on the bed or in the chair and has sufficient muscular strength to be completely lifted when they move. Maintains a good posture in the bed or on the chair at all times.	
NUTRITION Usual pattern of food intake	1.- Very poor: Is fasting; or on a liquid diet; or with a drip for more than 5 days. Or albumin < 2.5 mg/dl. Or never eats a full meal. Rarely eats more than half of any food offered. The intake of proteins includes 2 or fewer servings of meat, fish or milk products a day. Drinks little fluids Does not take a dietary liquid supplement.	2.- Inadequate: Given an enteral nutrition (SNG) or parenteral nutrition (IV) that provides an inadequate amount of calories and minerals for their age. Or albumin < 3 mg/dl. Or rarely eats a full meal and generally only eats half of any food offered. The intake of proteins includes 3 or fewer servings of meat, fish or milk products a day. Occasionally takes a dietary supplement.	3.- Adequate: Given an enteral nutrition (SNG) or parenteral nutrition (IV) that provides an adequate amount of calories and minerals for their age. Or eats more than half of most meals. Eat a total of 4 servings of protein per day (meat, fish, and dairy products). Occasionally rejects a meal, but normally takes a supplement if offered one.	4.- Excellent: Has a normal diet that provides adequate calories for their age. For example: eats/drinks most of every meal/intake. Never refuses a meal. Normally eats a total of 4 or more servings of meat, fish or milk products a day. Occasionally eats between meals. Does not need supplements.	
ISSUE PERFUSION AND OXYGENATION	1.- Very compromised: Hypotensive (TAm < 50mmHg; < 40 in newborns). Or the patient cannot physiologically tolerate postural changes.	2.- Compromised: Normotensive; The serum pH is < 7.40; Oxygen saturation may be < 95 % or haemoglobin may be < 10mg/dl or the capillary filling may be > 2 seconds.	3.- Adequate: Normotensive; The pH of the blood is normal; Oxygen saturation can be < 95% or haemoglobin may be < 10mg/dl or the capillary filling may be > 2 seconds.	4.- Excellent: Normotensive; The oxygen saturation is > 95 % normal haemoglobin; and the capillary filling < 2 seconds.	
TOTAL					

Table 8: Braden Q Scale

ANNEX 4 POSTURAL CHANGES

Postural changes or repositioning of immobilised patients aims to reduce the duration and the magnitude of the pressure exerted on vulnerable areas of the body and contributes to the comfort, hygiene and dignity and the functional capacity of the individual.

Carrying out postural changes in all those patients at risk of suffering PU and in all those who already suffer them unless contraindicated, demonstrates a high degree of evidence (**evidence A++**).²

Patients, who have mobility problems and are bedridden, shall have postural changes every 2 to 3 hours following a programmed and individualised rotation according to the PU risk. If there is a SEMP as mattress the frequency of change could be every 4 hours, provided that the patient can tolerate it. As a general proposal, there is an outline below of how to rotate postural changes.

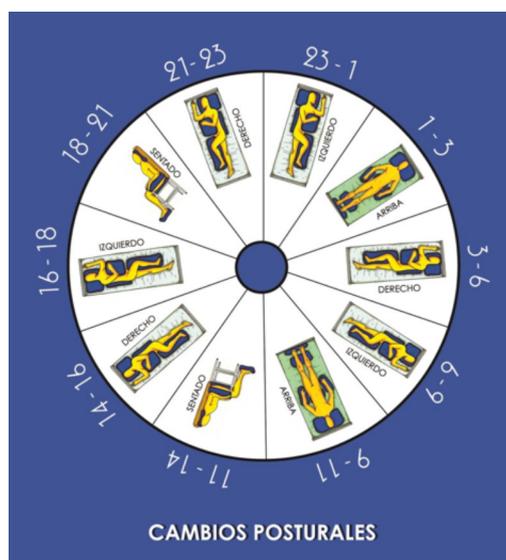


Illustration 5: Rotation of postural changes

When the patient tolerates the sitting position, they will be encouraged to reposition themselves, using their arms, every 15 minutes. If there were not able to do this independently, they must be repositioned by the carers. The time an individual spends sitting in a chair with no pressure relief should be limited.

When carrying out posture changes the following will be taken into account:

- Maintain the body alignment, distribution of the weight and balance of the patient.
- Keep the bed clean and dry without wrinkles.
- Avoid directly supporting the patient on their injuries.
- Avoid direct contact of bony prominences between themselves.
- Avoid dragging.
- Monitor probes, masks and nasal tubes, drains, IV's and dressings, avoiding the constant pressure on an area, with the risk of producing a PU.

- Do not use floats or ring type devices, due to the high risk of generating window oedema and/or ulcers in a circular crown.
- Follow the recommendations of occupational health on the handling of loads and weights.
- Remember that supplementary material does not substitute mobilisation.
- To facilitate the change of posture, mobilisation and to change linen with greater ease without dragging the patient, it is suggested that a stretched a draw sheet, or transverse sheet be fitted. In order to optimise the benefit of dynamic SEMP's a single sheet should be used as the bottom sheet.

POSITIONS

To alleviate and eliminate the pressure at the points of support, it is essential to perform posture changes, maintaining the alignment of the body as closely as possible and carefully studying the way to reduce the effects of prolonged pressure on bony prominences. But for this it is very important to bear in mind the patient's health problems, since in some cases this may lead to certain changes in the positioning of patients, which can differ from the general recommendations, which does not exempt the implementation of a monitoring and redistribution of pressures with the appropriate frequency.

SUPINE POSITION: They will be cushioned with pillows-cushions in the following way:

- The pillow underneath the head will seek the body alignment with the back, by filling in the cervical hollow
- Under the lumbar area (before a significant lordosis, a small pillow will be positioned)
- One under the calves (avoiding the contact of the heels with the mattress)
- One physiologically maintaining position of the sole of the foot (preventing the equine foot).
- Two under the forearms (this pillow also helps to prevent external rotation of the trochanters).

DECÚBITO SUPINO

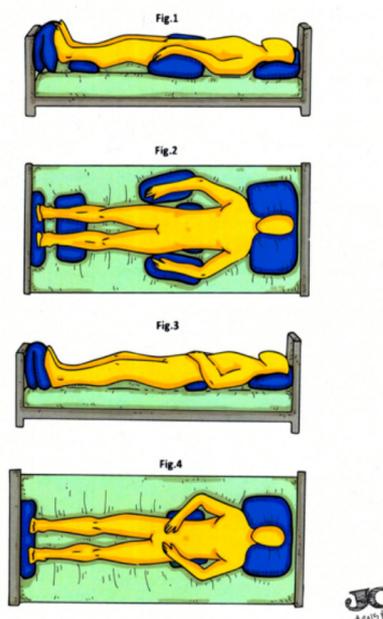


Illustration 6: Supine position

Body areas which sustain the greatest pressure in this position:

Heels, sacrum, coccyx, occipital zone, shoulder blades and elbows.

Precautions:

- Keep the head up, with the face upwards, in a neutral position and straight so that is in alignment with the rest of the body.
- The knees must remain slightly bent, avoiding hyperextension.
- Keep the elbows and hands in slight flexion, looking for the most physiological position. The pillows are placed under the hand and the forearm up to the elbow (optional).
- Avoid the rotation of the trochanters.
- If the head of the bed has to be elevated, it shall not exceed 30°.

FOWLER POSITION: They will be padded with pillows in the following way:

- One behind the head.
- One in the sacrum area.
- One under the thigh to prevent slippage.
- One under each arm.
- One on which the feet can be supported, with the aim of avoiding equine foot.
- One under the calves releasing the heels from support.

Body areas which sustain the greatest pressure in this position:

Sacrum, shoulder blades, and ischial tuberosities, heel.

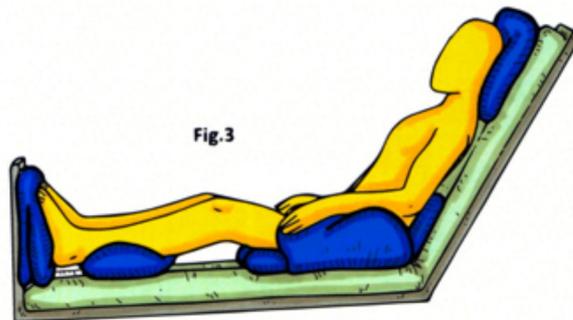


Illustration 7: Fowler position

Precautions:

This position should not be maintained beyond the time required as it is not recommended in patients who have little or no mobility, as a direct relationship has been demonstrated between a greater angle of the bed and a higher frequency of occurrence of PU.

IN PRONE POSITION:³⁶ They will be padded with pillows in the following way:

- A small one below the turned head.
- One in the sternal region without taking in the shoulders.
- Another pillow under the abdomen, between the diaphragm and the iliac crests, with the purpose of encouraging chest expansion.
- One under the thighs.
- One under the legs.

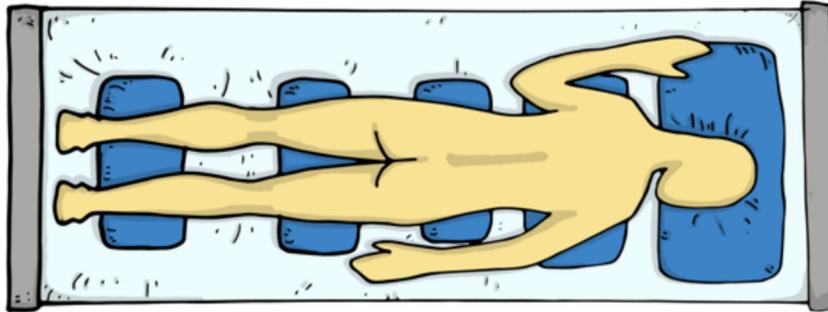


Illustration 8: The prone position

Body areas which sustain the greatest pressure in this position:

Cheeks and ears, breasts in women, genitals in men, apophysis acromial of shoulders, knees and toes.

Precautions:

- This positioning will be considered provided that the individual can tolerate it and their conditions permit. In the field of critical care it is a relatively frequent position when the patient suffers from certain oxygenation disorders.
- The arms will be placed as shown in the previous drawing, one with the elbow bent and slightly separated from the body, while the other arm will remain stretched, and the frequency of that positioning of the arms must be frequently alternated to avoid lesions.
- Avoid supporting the iliac crests on the pillow.

LATERAL RECUMBENT POSITION: They will be padded with pillows in the following way:

- One under the head.
- One supporting the lumbar back region.
- One separating the knees and providing support to the upper leg.
- One under the upper arm.

DECÚBITO LATERAL VENTRAL E DORSAL

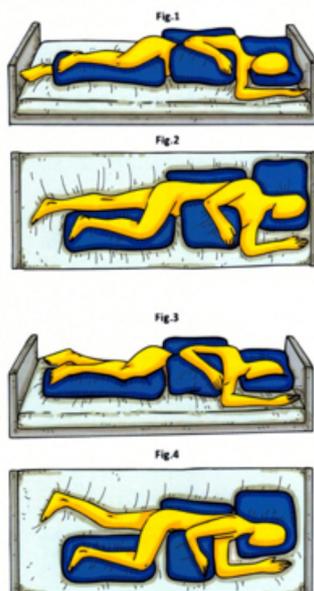


Illustration 9: Lateral recumbent position

Body areas which sustain the greatest pressure in this position:

Ears, shoulder, trochanters, ribs, shoulder blade iliac crests, shinbones and malleolus.

Precautions:

Dorsal recumbent position

- The back lumbar region will be supported in the pillow forming an angle of approximately 30°.
- The legs will be in slightly bent. The leg located in contact with the bed will be slightly behind with respect to the other.
- The feet at an angle with the leg.
- The feet and hands must retain a functional position.

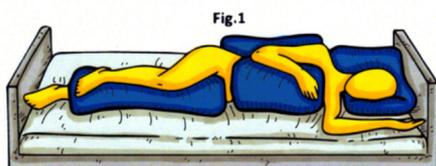


Illustration 10: Lateral dorsal recumbent position fig. 1

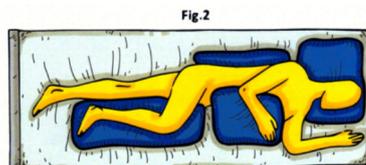


Illustration 11: Lateral dorsal recumbent position fig. 2

Ventral recumbent position

- In this lateralisation the hip is flexed by placing the knee that is up ahead of the body, resulting in a triangular base of the greatest and most stable support.
- This flexing decreases lordosis and favours the alignment of the spine.
- It is good for rest and sleeping of patients.

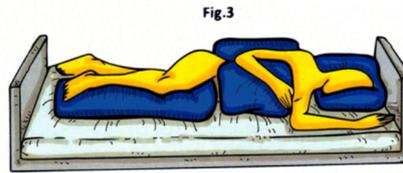


Illustration 12: Ventral Lateral recumbent position

SITTING:

They will be padded with pillows in the following way:

- One behind the head.
- One under each arm.
- One under the feet.

Body areas which sustain the greatest pressure in this position:

Shoulder blades, sacrum and ischial tuberosities.

Precautions:

- Put the chairs in neutral position (90°).
- The foot must be at a 90° angle with respect to the leg, fully supporting the sole, using for this purpose a pillow or lift if necessary.
- The ribs are comfortably supported against a firm surface.
- The unstable situation in the chest will not be allowed.
- The knees are separated slightly, avoiding contact of bony prominences.
- The use of previously padded, not rigid chairs is adequate.

SEDESTACIÓN

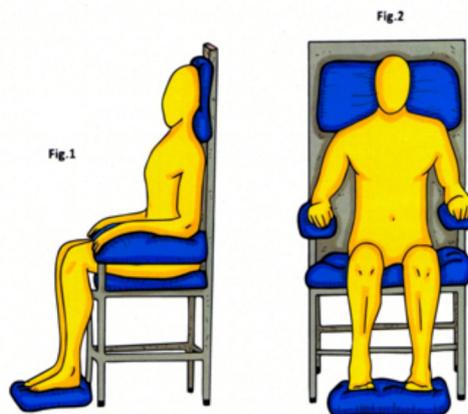


Illustration 13: Sitting position

ANNEX 5

METHODS TO MEASURE THE SIZE OF THE PU

The size of a PU is one of the few parameters that can quantitatively tell us of the progress or reversal of healing. It is also a fact that should be taken into account in issuing a healing prognosis.

In literature there are many methods to measure the size of the PU (here only a few are set out. In general, they all have some type of error in the measurement or difficulty to be used in daily clinical practice, but in the end what matters is not the exact value of the area or the volume of the wounds, but also to register their evolution over time, bearing in mind that the size of the wound is usually inversely proportional to good progress. The method we use should be easy to carry out and must not consume too much time or resources. Some tools for the monitoring and assessment of chronic wounds simply use surface measurements, so it could be an optimal way of initial measurement, but a correction factor may be added if the volume is relevant.

MEASUREMENT METHODS ¹⁹	
OF THE SURFACE	
Line measurement: Graph paper is used that superimposed on acetate where the tracing of the wound was made in order to calculate the surface.	
Height by width measurement: The diameters greater than the axis of the wound are measured and are multiplied, with which will provide an approximate surface value.	
Body planes measurement: The largest sagittal and axial diameters are measured and the result of their multiplication gives an approximate surface value.	
Measurement with correction factor: The diameters are measured using either of the two previous methods and are multiplied by the correction factor, which gives a value of the approximate surface according to Kundin and Vodwen offers another method, but there is a need for a computer to calculate it.	$\pi/4$
Digitised measure: Requires computer equipment, drawing software and digitized table.	
Photograph measurement: Requires a camera and a ruler template. There are several programmes that, based on the area traced in a photo, give us their measurement.	Mouseyes.exe
Digital panel: Recent, allows the automatic calculation of the area or the size of a tracing on a film. It has a probe to calculate the depth.	Visitrak
OF THE VOLUME	
Berg Measurement: A polyurethane film is stuck to the wound and, using a syringe with saline, this is filled to obtain the volume that the wound has (Walter Berg et al., 1990 method).	
Kundin measurement: Product of the actions of the major axis and the maximum depth and the correction factor (Kundin, 1985).	0.257
Stereo-photometry: Erikson method, which uses a special camera and its result is interpreted with a computer.	
Ultrasonic depth scanner: Used by Whiston with uneven results.	
Using moulds: Covington used a Reprosil vivyl polysiloxane of high viscosity. Resech used wet calcium filling the wound and then weighing it and using its density 1.13 g/cm ³ (Jeltrate) to calculate the volume.	
Structured light: Through the projection of a few packs of light that a computer interprets, you get a three-dimensional shape of the wound that can be measured.	

Table 9: Methods to measure the size of the PU

Paragraph 2: Monitoring instrument of the Evolution of a Pressure Ulcer (IMEUPP)

The registration of a PU is a fundamental element of the therapeutic process.

Given the large amount of data generated by the care of a patient with pressure ulcers, the registration of these should be done so simply and validly.

The PUSH utility (Pressure Ulcer Scale for Healing) designed, tested and validated by the NPUAP (National Pressure Ulcer Advisory Panel) and translated and endorsed by the GNEAUPP (National Group for the Study and Advice on Pressure Ulcers and Chronic Wounds) is the one recommended to be used for a correct assessment of the evolution and healing of a PU. PUSH has its version in Spanish as: Instrument to monitor the evolution of a PU (IMEUPP).

Its use is simple and its basic guidelines are:

- Observe and measure the PU.
- Classify the ulcer with respect to the approximate size of its surface.
- Assess the amount of exudate.
- Assess the type of ulcer bed.
- Record the score of each one of these valuations.
- Add these scores to obtain the total value, which will be the IMEUPP index.

The maximum score that can be obtained is 17, the minimum being 0, which corresponds with it being healed. When comparing the total score (IMEUPP index) with previous actions this reports the evolution towards healing or worsening of the ulcer.

The two sheets that complement this Annex are:

Paragraph B1: *Instruction sheet and definition of terms* so that the assessments are homogeneous interobserver (Paragraph A).

Paragraph B2: *Record Sheet* (one will be used for each PU) (Paragraph B).

Paragraph B1: Instruction sheet and definition of terms.

	0	1	2	3	4	5	6	7	8	9	10	TOTAL ****
Length x Width*	0	<0.3	0.3-0.6	0.7-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-8.0	8.1-12.0	12.1-24.0	>24.0	
Amount of exudate**	none	poor	moderate	abundant								
Type of tissue***	Healthy *	Epithelial **	Granulatio ***	Fibre/ Slough ****	Necrotic *****							

Table 11: Instruction sheet and definition of the terms of the IMEUPP index de UPP

* Measure the greatest length from up and down and the greatest width from left to right using a measuring tape. Multiply these two measurements to obtain an estimated value of the surface of the ulcer in square centimetres. Always use a tape measure and always the same method to measure. Do not guess the measurements.

** Estimate the amount of exudate present after removing the bandage and the dressings and before applying any topical agent to the ulcer.

*** Refers to the type of tissue present in the ulcer bed.

- Score is 4 when there is some necrotic tissue.
- Score is 3 when there is no necrotic tissue, but there is fibre or slough.
- Score is 2 when the ulcer is clean and contains granulation tissue.
- A superficial ulcer that is being re-epithelised is scored as 1 and 0 when the skin is healthy.

****** Result of the sum of the above paragraphs.**

* The ulcer is completely covered with epithelium (new skin).

** In superficial ulcers, pink or shiny tissue that is grouped in the form of islands in the area of the ulcer.

*** Fine pink or red tissue with shiny appearance, moist and granulated.

**** Yellow or white tissue that adheres to the ulcer in chains or slight traces or is mucinous.

***** Eschar: black, brown or that tissue that adheres firmly to the ulcer bed or to the edges and that is stronger or softer than the surrounding skin.

STEP 1	Measure axis of ulcers and multiply them. With that value, get the 0 to 10 in the table.
STEP 2	Estimate the amount of exudate after removing the dressings and before applying some topical agent to the ulcer. Select the appropriate score according to the table.
STEP 3	Identify the type of tissue and note the score, according to the table.
STEP 4	Add all previous scores to get the total.
STEP 5	Pass the total to the UPP healing chart. Changes in the score each indicate the change in ulcer status. If the score is low, this indicates that the ulcer is healing and if it rises the ulcer is deteriorating.

Table 10: Instruction sheet and definition of IMEUPP index terms

Paragraph B2: Record Sheet.

Registration of healing of PU																
Date																
Length x Width																
Amount of exudate																
Tissue Type																
TOTAL																
Graph of the evolution of a PU																
17																
16																
15																
14																
13																
12																
11																
10																
9																
8																
7																
6																
5																
4																
3																
2																
1																
0																

Tabla 12: Record sheet of the IMEUPP index

ANNEX 6

PAIN ASSESSMENT SCALES

Paragraph A. Visual analogue scale for pain (VAS)

The **Visual Analogue Scale (VAS)** allows the intensity of the pain that the patient describes to be measured with the highest reproducibility between the observers. It consists of a horizontal 10 centimetre line, at the ends of which are the extreme expressions of a symptom. On the left is the absence or lesser intensity and on the right the highest intensity. The patient is asked to mark the line point to indicate the intensity and this is measured with a ruler in millimetres. The intensity is expressed in centimetres or millimetres.

The assessment shall be:

- Mild pain if the patient scores the pain as less than 3
- Moderate pain if the assessment is between 4 and 7.
- Severe pain if the assessment is equal to or greater than 8.



Figure 17: VAS Assessment scale

Paragraph B. Assessment scale for pain in patients with dementia: Pain Assessment in Advanced Dementia (PAINAD)³⁷

This is an easily applied scale that consists of 5 elements: respiration, negative vocalisation, facial expression, body language and relief ability. Each item can get a maximum score of 2. The total scores can be 0 (without pain) to 10 (maximum pain), equivalent to the VAS.

Items	0	1	2	SCORE
Breathing independent of vocalization	Normal	Hard sporadic breathing. Short periods of hyperventilation.	Laborious and noisy breathing. Long periods of hyperventilation. Cheyne-Stoke breathing.	
Negative vocalization	None	Sporadic moaning or lamentations. Speaks with low volume or disapproval.	Altered or repetitive calls. High volume moaning or lamentation.	
Facial expression	Smily or expressionless	Sad, sulky or scared.	Waves of disgust or disapproval.	
Body language	Relaxed	Tense, walks aside, repeatedly moves the hands.	Rigid, closed fists, flexed knees, grabs, pushes, physical.	
Relief capacity	Does not need relief	Gets distracted or calmed by voice or contact.	It is not possible to relieve, reassure or distract him.	
TOTAL				



Table 13: Assessment scale for pain in patients with dementia: Pain Assessment in Advanced Dementia (PAINAD)

Paragraph C. Scale of assessment for pain in critical patients Behavioural Pain Scale (BPS)³⁸

Paragraph C. Scale of assessment for pain in critical patients Behavioural Pain Scale (BPS) 38
 The Behavioural Pain Scale (BPS) is a scale that was developed to detect and measure the pain in the critical patient, based on behavioural indicators. It has a good degree of reliability and validity, including 3 items (facial expression, movement of upper limbs and adaptation to the mechanical ventilation).

Parameters	1 point	2 points	3 points	4 points	TOTAL
Facial Expression	Relaxed.	Partially contracted (for example frowning).	Strongly contracted (for example eyes closed) frequently.	Grimace of pain.	
Movement of upper limbs	No movement.	Partially flexed.	Strongly flexed with bending of fingers.	Permanently flexed.	
Adaptation to Mechanical Ventilation	Tolerates mechanical ventilation.	Coughing, but tolerating mechanical ventilation most of the time.	Fighting against the ventilator	Impossible to ventilate.	

Absence of pain: 3 points - Maximum pain: 12 points

Table 14: : Assessment scale for pain in critical patients Behavioural Pain Scale (BPS)

