CharitéCentrum für Innere Medizin und Dermatologie

Charité | Campus Mitte | 10098 Berlin

KLINIK FÜR DERMATOLOGIE, VENEROLOGIE UND ALLERGOLOGIE

Klinik mit zertifiziertem Qualitätsmanagementsystem nach DIN EN ISO 9001:2008

CLINICAL RESEARCH CENTER FOR HAIR AND SKIN SCIENCE

Prof. Dr. med. U. Blume-Peytavi
ulrike.blume-peytavi@charite.de

Kompetenzzentrum für Haare und Haarerkrankungen
Tel. +49 30 450 518 257 (Diagnostik)
Tel. +49 30 450 518 242 (Terminvereinbarung)
Fax +49 30 450 518 952
crc-haare@charite.de; www.hairberlin.com

Kinderdermatologische Hochschulambulanz
Tel. +49 30 450 618 407 Fax +49 30 450 518 952
crc-kinder@charite.de; www.kinderdermaberlin.com

Klinisches Studienzentrum für Haut- und Haarforschung
Tel. +49 30 450 518 178 Fax +49 30 450 518 955
crc-studien@charite.de; www.crcberlin.com
www.derma.charite.de

CONFIDENTIAL

Study Protocol

A RANDOMIZED CONTROLLED PARALLEL-GROUP TRIAL TO INVESTIGATE THE EFFECTIVENESS OF TWO SILICONE DRESSINGS FOR SACRAL AND HEEL PRESSURE ULCER PREVENTION COMPARED TO NO DRESSINGS

Code: CRC-PU-A-16

Version 4, September 29, 2015

SPONSOR
Clinical Research Center for Hair and Skin Science,
Department of Dermatology and Allergy,
Charité – Universitätsmedizin Berlin
Charitéplatz 1, 10117 Berlin, Germany

On behalf of the Clinical Quality and Risk Management
Charité – Universitätsmedizin Berlin
Charitéplatz 1, 10117 Berlin, Germany

INVESTIGATOR
Dr. Jan Kottner
Clinical Research Center for Hair and Skin Science,
Department of Dermatology and Allergy,
Charité – Universitätsmedizin Berlin
Charitéplatz 1, 10117 Berlin, Germany
Email: jan.kottner@charite.de

PROTOCOL DEVELOPMENT
Dr. Jan Kottner
Prof. Dr. Ulrike Blume-Peytavi
Clinical Research Center for Hair and Skin Science,
Department of Dermatology and Allergy,
Charité – Universitätsmedizin Berlin
Charitéplatz 1, 10117 Berlin, Germany
Email: jan.kottner@charite.de

PROTOCOL REVIEW
Armin Hauss
Dr. Jan Steffen Jürgensen
Clinical Quality and Risk Management
Charité-Universitätsmedizin Berlin, Germany

Table of contents

List of figures

Abbreviations

ADE	Adverse Device Effect
AE	Adverse Event
AQUA	Institut für angewandte Qualitätsförderung und Forschung
BfArM	Bundesinstitut für Arzneimittel und Medizinprodukte
CC	CharitéCenters
CE	Conformité Européenne
CEA	Cost effectiveness analysis
CIP	Clinical investigation plan
CP	Conditional power
CRC	Clinical Research Center for Hair and Skin Science
CRF	Case report form
DD	Device deficiency
DTI	Deep tissue injury
ED	Emergency department
EPUAP	European Pressure Ulcer Advisory Panel
ICER	Incremental cost effectiveness ratio
ICF	Informed consent form
ICU	Intensive care unit
IIS	Investigator initiated study
LOCF	Last observation carried forward
NPUAP	National Pressure Ulcer Advisory Panel
PPPIA	Pan Pacific Pressure Injury Alliance
PU	Pressure ulcer
PUCLAS	Pressure ulcer classification
QM	Clinical Quality and Risk Management
RR	Relative risk
SADE	Serious Adverse Device Effect
SAE	Serious adverse event
SD	Source data
SOP	Standard operating procedure
TMF	Trial master file

1 Administrative Information

1.1 Title

A randomized controlled parallel-group trial to investigate the effectiveness of two silicone dressings for sacral and heel pressure ulcer prevention compared to no dressings

1.2 Trial registration

The study is registered at https://clinicaltrials.gov/. The ClinicalTrials.gov Identifier is NCT02295735.

1.3 Protocol version

Version 4 of September 29, 2015

1.4 Funding

This investigator initiated study (IIS) is conducted by the Clinical Research Center for Hair and Skin Science, Department of Dermatology and Allergy, Charité – Universitätsmedizin Berlin. on behalf of the Central Quality Management (QM) of the Charité-Universitätsmedizin Berlin. The trial is supported by Mölnlycke Healthcare AB. Mölnlycke provides the silicone dressings Mepilex® Border Sacrum and Mepilex® Border Heel for the intervention group.

1.5 Roles and responsibilities

Sponsor and principle investigator

Dr. Jan Kottner
Clinical Research Center for Hair and Skin Science
Department of Dermatology and Allergy
Charité – Universitätsmedizin Berlin
Charitéplatz 1, 10117 Berlin, Germany
Phone: +49 30 450 518 218
Fax: +49 30 450 7618 229
Email: jan.kottner@charite.de

Project leader and scientific contact

Dr. Jan Kottner
Clinical Research Center for Hair and Skin Science
Department of Dermatology and Allergy

Charité – Universitätsmedizin Berlin
Charitéplatz 1, 10117 Berlin, Germany
Phone: +49 30 450 518 218
Fax: +49 30 450 518 998
Email: jan.kottner@charite.de

Manufacturer of the study products

Mölnlycke Healthcare AB
Göteborg, Sweden
Contact person
Jill McLean
Global Therapy Manager - Pressure Ulcers
Molnlycke Health Care
Phone: +46739412656
Email: Jill.Mclean@molnlycke.com

Protocol development

Dr. Jan Kottner
Annette Andruck
Elisabeth Hahnel
Prof. Dr. Ulrike Blume-Peytavi

Protocol review

Armin Hauss
Clinical Quality and Risk Management
Charité-Universitätsmedizin Berlin, Germany
Phone: +49 30 450529055
Email: armin.hauss@charite.de

Trial statistician

Andrea Stroux
Department of Biometry and Clinical Epidemiology
Charité-Universitätsmedizin Berlin, Berlin, Germany
Charitéplatz 1, 10117 Berlin, Germany
Phone: +49 30 8445 32 62 / 450 562 155
Fax: +49 30 8445 4471
Email: andrea.stroux@charite.de

2 Introduction

2.1 Background and Rationale

Pressure ulcers (PUs) are severe forms of skin and tissue lesions caused by prolonged compression and deformation of soft tissues. PU prevalence and incidence is high especially in high risk settings like geriatric, long-term or intensive acute care. According to the latest Global Burden of Disease Study 2010 PUs were assigned the highest disability index (Hay et al. 2014). In adults the majority of PU occurs at the heels and at the sacral area (Kottner, Raeder 2014). The occurrence of PUs in hospitals is widely accepted as an unwanted adverse outcome in patient care. PU incidence and/or hospital acquired PU prevalence are widely accepted indicators of the quality of care (Kottner, Lahmann 2013; Unbeck et al. 2013). In Germany PU incidence figures are regularly used to make country wide comparisons of PU prevention and treatment performance in hospitals (AQUA 2012). However, effective and efficient PU prevention especially in high risk settings is still challenging and there is a high need to optimize prevention further.

PU prevention includes the identification of PU risk and the application of preventive measures. Mobility and activity limitations are the most important PU risk factors. The cornerstone of PU prevention is repositioning, early mobilization and the use of special support surfaces (National Pressure Ulcer Advisory Panel (NPUAP), European Pressure Ulcer Advisory Panel (EPUAP), Pan Pacific Pressure Injury Alliance (PPPIA) 2014). In addition, there is emerging evidence that the application of dressings on pressure ulcer predilection sites may help to prevent PU development (Clark et al. 2014). In the latest Pressure Ulcer Prevention and Treatment Guideline the use of prophylactic dressings is considered as an emerging preventive intervention (NPUAP, EPUAP, PPPIA 2014). Preventive dressings on intact skin might reduce friction and shear forces and/or modify the microclimate (Park 2014, Santamaria et al. 2013a). Both mechanisms might protect the skin and underlying tissues from pressure/deformation injury. Because this new approach might potentially further reduce PU incidence, thus increasing hospital patient safety, the Clinical Quality and Risk Management of the Charité-Universitätsmedizin Berlin decided to investigate, whether these dressings are also effective at the Charité-Universitätsmedizin Berlin.

2.2 Objectives

Primary objective

• To determine if preventive silicone dressings (Mepilex® border) applied to the heels and to the sacrum in addition to PU standard prevention reduce the cumulative PU incidence category II, III, IV, and deep tissue injury (DTI) compared to PU standard prevention alone in at high or very high risk hospital patients.

Secondary objectives

• To determine if preventive silicone dressings (Mepilex® border) applied to the heels and to the sacrum in addition to PU standard prevention reduce the PU incidence density category II, III, IV, and deep tissue injury (DTI) compared to PU standard prevention alone in at high or very high risk hospital patients.
• To determine if preventive silicone dressings (Mepilex® border) applied to the heels and to the sacrum in addition to PU standard prevention reduce the cumulative PU incidence category I compared to PU standard prevention alone in at high or very high risk hospital patients.
• To determine if preventive silicone dressings (Mepilex® border) applied to the heels and to the sacrum in addition to PU standard prevention reduce the PU incidence density category I compared to PU standard prevention alone in at high or very high risk hospital patients.
• To determine if preventive silicone dressings (Mepilex® border) applied to the heels and to the sacrum in addition to PU standard prevention increase days free of PUs category I, and category II, III, IV, and DTI compared to PU standard alone in at risk hospital patients.
• To determine if preventive silicone dressings (Mepilex® border) applied to the heels and to the sacrum in addition to PU standard prevention are cost effective.

2.3 Trial design

A randomized, controlled, two arm, superiority pragmatic trial will be performed with a 1:1 allocation to the intervention and control groups. After completion of 50% of the subjects an interim analysis will be conducted to allow potential early stopping (futility stopping based on conditional power) (see 6.2).

3 Methods: Participants, interventions, and outcomes

3.1 Study setting

The study will be conducted at the Charité university hospital (Berlin, Germany) in critically ill and/or trauma patients who are admitted to the emergency department and/or to intensive care units (ICUs).

3.2 Eligibility criteria

Inclusion criteria

• Age 18+ years

• Major trauma and/or critically ill surgical and/or internal patients (e.g. with cardiac arrest) admitted to the emergency department and being transferred and/or admitted or directly to a surgical or internal ICU

• Major trauma and/or critically ill surgical and/or internal patients admitted through an in-house hospital transfer to a surgical or internal ICU (e.g. postoperative complications or acute deterioration of general health)

• Being at “high” or “very high” PU risk according to the Charité PU prevention standard:

- Category 3 (=care dependent/limited bed mobility)
- 4A (= high care depended, limited mobility in bed)
- 4B (= high care dependent, totally immobile) according to the Jones classification modified by Charité

• Expected minimum length of stay at least three days

• Informed consent (or by legal representative)

Exclusion criteria

• Patients at end of life/dying patients

• Existing PU or other skin/tissue lesion (e.g. scars) at heels or sacral skin

• Positioning on air fluidized beds

• Known allergy to Mepilex® dressings

• Patients who cannot be repositioned due to medical reasons (e.g. cardiovascular instability, suspected or actual spinal cord injury)

• Trauma to sacrum and/or heels

• Exclusion based on complicated or not possible positioning of patients with the following diagnoses (ICD-10-GM version 2015): 66.2; J80.0; S06.-; G93.2; I60.-; I63.-

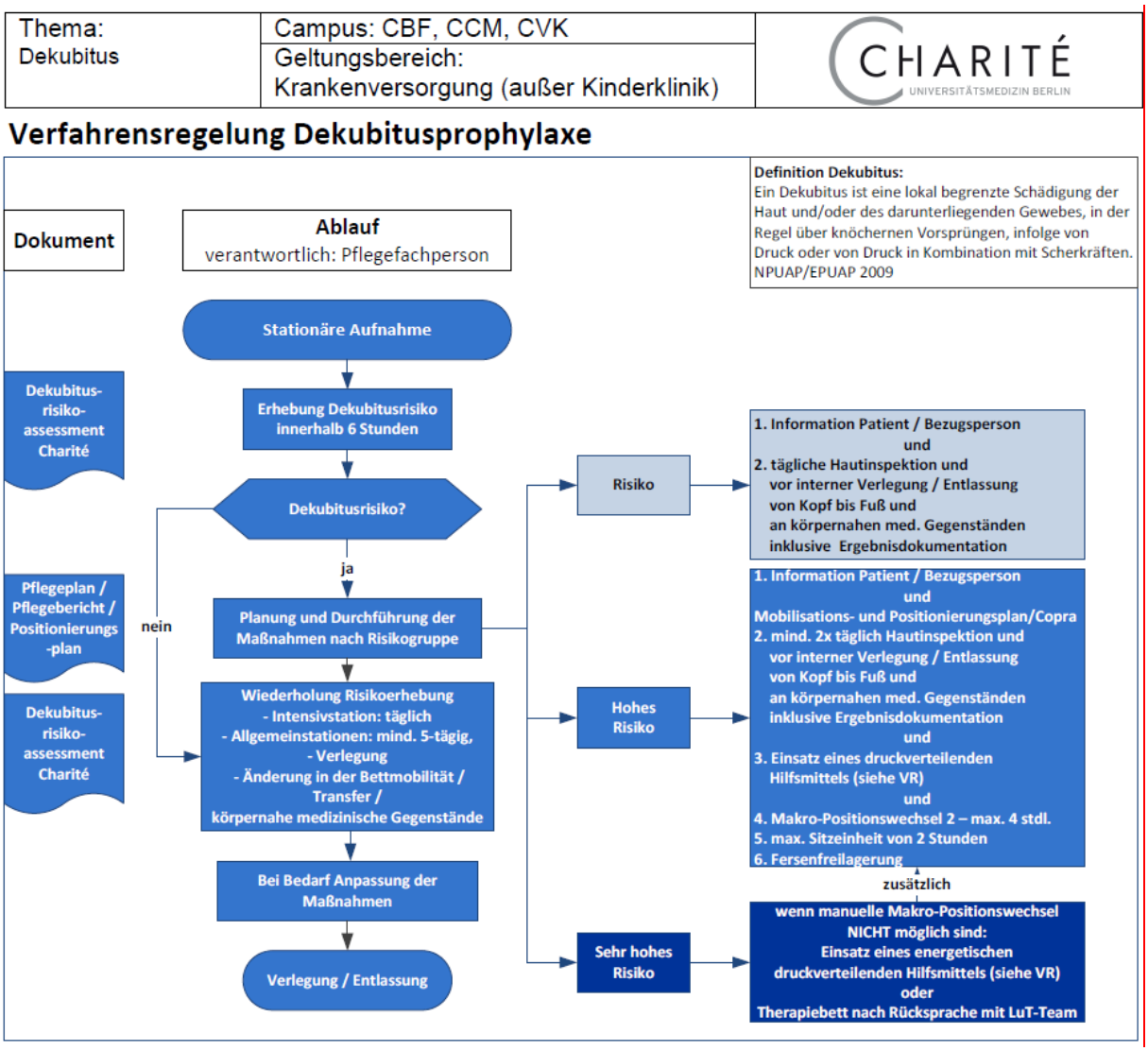
• Exclusion due to certain procedures (OPS version 2015): 8-390.0; 8-390.3; 8-390.4; 8-852

As this study does not involve any drugs, systemic agents or any other invasive techniques, patients would be eligible even if they participate in another trial.

3.3 Interventions

Within the study PU prevention for all patients follows the Charité university hospital pressure ulcer prevention standard (Charité-Universitätsmedizin Berlin 2012) (Figure 1).

Figure 1. Current pressure ulcer prevention standard at the Charité



This includes PU risk scoring and skin inspection within 6 hours after admission and depending on the risk categories “high risk” and “very high risk” the implementation of preventive measures including: (1) patient information, (2) daily skin inspection, (3) mobilization, (4) use of special support surfaces, (5) repositioning and (6) floating heels. Regarding general skin and incontinence care there are no other standards implemented at the moment.

In case of potentially meeting the inclusion criteria for the study a researcher/research assistant of the CRC team will check the in- and exclusion criteria using a screening form. If eligible the assignment to one of the study groups will be performed by this researcher. This will be also done within 6 hours after admission to the ICU.

If a patient is assigned to the intervention group the dressings Mepilex® Border Sacrum and Mepilex® Border Heel will be applied by the researcher/research assistant onto the respective intact skin areas according to the instructions of the manufacturer and according to the study SOP (see Appendices 1 and 2). Special care will be taken that the Mepilex® Border Sacrum is carefully applied and that no other skin care products are used between the skin and the dressings. The dressings will be renewed every 3 days by the researcher/research assistant. In case of becoming soiled or dislodged they are changed immediately by the nurses and/or by the researchers. Nurses on the participating ICUs and on general wards will be instructed accordingly. In addition, in the intervention group laminated patient cards will be posted at and/or near the bed serving as reminder and containing minimum information about how to apply the dressings and the contact of the responsible researcher (Appendix 3). Dressings remain onto the skin during the whole study period also including transfer to another ward. All other PU preventive care and treatment procedures are performed as usual according to the Charité PU prevention standard (Figure 1).

Skin and tissue inspections are conducted and study variables are collected daily by instructed researchers/research assistants/study nurses in agreement with the ICU and general ward staff. The following educational activities will be conducted before and during the trial:

• Initiation visit/kick-off meeting explaining the study design, procedures, data collection and documentation methods
• One hour skin and PU classification instruction, followed by an online examination PUCLAS3 (Beeckman, Schoonhoven 2014) for all study nurses/research assistants doing skin examinations
• Unannounced patient visits by the principle investigator for duplicate data collection and skin examination

Research assistants/study nurses/researchers follow up all included patients once daily for ensuring study compliance, monitoring correct dressing use and fit, doing skin inspections at the heels and sacral area and for monitoring the health condition including daily

documentation of PU risk and resource use regarding dressings and possible PU treatment (dressings, wound care procedures).

The study/follow-up ends if:

• The patient is no longer at “high” or “very high” PU risk according to the Charité standard (Figure 1) and if no sacral or heel PU developed or
• Complete healing of a within the study period developed heel or sacral PU or
• An adverse event (AE) related to the preventive dressings occurred or
• The patient wishes to withdraw or
• A severe form of protocol violation occurred (e.g. non-wearing of the dressings for more than 24 hours) or
• The patient dies or
• The patient is transferred to another care setting outside the Charité Campus Virchow or is discharged from the hospital

Adherence to the study protocol is improved using the following strategies:

• Kick-off meetings and training on the participating ICUs and EDs
• Subject cards at the bedside (Appendix 3)
• Once daily follow-up visits and assessments by researchers including checks of dressing fit
• Monthly status reports about recruitment on the participating wards
• Unannounced patient visits by the PI for duplicate data collection and skin examination

3.4 Outcomes

Primary outcome

Name	**Method and metric**	**Time points of data collection**
Pressure ulcer category II, III, IV, Unstageable, DTI at heels or sacrum	• Clinical assessment using the NPUAP/EPUAP 2014 PU classification system • Proportions developed from baseline until end of study (cumulative incidence)	D0 and once daily

Secondary outcomes

Name	Method and metric	Time points of data collection
Pressure ulcer category II, III, IV, Unstageable, DTI at heels or sacrum	• Clinical assessment using the NPUAP PU classification system • Proportions developed per 1000 bed days (incidence)	D0 and once daily
Pressure ulcer category I (non-blanchable erythema) at heels and/or sacral area	• Clinical assessment using the NPUAP PU classification system • Proportions developed from baseline until end of study (cumulative incidence)	D0 and once daily
Pressure ulcer category I (non-blanchable erythema) at heels and/or sacral area	• Clinical assessment using the NPUAP PU classification system • Proportions developed per 1000 bed days (incidence)	D0 and once daily
Days free of sacral and/or heels pressure ulcers category I, II, III, IV, DTI	• Clinical assessment using the NPUAP PU classification system • Number	D0 and once daily
Resources associated with heel and sacral PU prevention	• Preventive dressings (n), time for dressing application (minutes; data source: estimation) • Type of support surface (standard, special elastic foam, viscoelastic foam, low air loss overlay/mattress, alternating air mattress; data source: clinical records and direct observation) • Type of turning (30° degrees left/right, supine, prone, other; data source: clinical records)	D0 and once daily
Resources associated with heel and sacral PU treatment	• Wound assessments (number and times; data source: clinical records and estimation) • Wound infection diagnoses, e.g. swabs, biopsies (number, times; data source: clinical records and estimation) • Therapeutic primary and secondary dressings (numbers, types), time for dressing application/changes (minutes; data source: clinical records and estimation) • Debridement (numbers and types incl. material; data source: clinical records and estimation) • Systemic antimicrobial treatment because of PU wound (number, types; data source: clinical records)	D0 and once daily

Heel and sacral PU healing	• Complete epithelialization • Mean (days)	D0 and once daily

Other variables

Name	Method and metric	Time points
Age	• Obtained from clinical records • Mean (years)	D0
Gender	• Obtained from clinical records • Proportion (male/female)	D0
Body mass index	• Obtained from clinical records • Mean (kg/m^2)	D0
PU risk	• Scoring based on Charité standard • Risk category (none/at risk/at high risk/at very high risk)	D0 and once daily
PU risk	• Scoring based on Braden score • Mean (A.U.)	D0 and once daily
Main and other medical diagnoses at admission	• Obtained from clinical records • Coding according ICD-10	D0
Main and other medical diagnoses or procedures before the ICU stay (peripheral wards)	• Obtained from clinical records • Coding according ICD-10 • Coding according OPS version 2015	D0
Diabetes mellitus	• Obtained from clinical records • yes/no	D0
Tetraplegia	• Obtained from clinical records • yes/no	D0
Length of stay on peripheral wards / type of ward before ICU transfer	• Obtained from clinical records • Mean (days)	D0
Length of stay in emergency department	• Obtained from clinical records • Mean (hours)	D0

Length of stay in operating room	• Obtained from clinical records • Mean (hours)	D0, or if necessary
Length of stay in ICU	• Obtained from clinical records • Mean (days)	D0 and once daily
Length of mechanical ventilation	• Obtained from clinical records • Mean (hours, days)	D0 and once daily
Mean arterial blood pressure	• Obtained from clinical records/monitoring • Mean (mmHg)/24h	D0 and once daily
Body temperature	• Obtained from clinical records/monitoring • Mean (°C)/24h	D0 and once daily
Heart rate	• Obtained from clinical records/monitoring • Mean (beats/minute)	D0 and once daily
Urine incontinence	• Obtained from clinical records and direct observation • Urine in direct contact with skin • Mean (days)	D0 and once daily
Stool incontinence	• Obtained from clinical records and direct observation • Stool in direct contact with skin • Mean (days)	D0 and once daily
Catecholamines	• Obtained from clinical records • Type (adrenalin, noradrenalin ...) • Mean lengths of application (days) • Mean doses (µl/kg/min)	D0 and once daily
Support surface	• Obtained from clinical records and direct observation • Type (standard, special elastic foam, viscoelastic foam, low air loss overlay/mattress, alternating air mattress) • Mean lengths stay on the support surface (days)	D0 and once daily
Positioning	• Obtained from clinical records and direct observation • Type (30° degrees left/right, supine, prone, other) • Mean lengths of position (hours)	D0 and once daily
Smoker	• Obtained from clinical records • Proportion (yes/no)	D0

3.5 Participant timeline

The expected flow of participants is shown in Figure 2. The time line of an individual patient is shown in Table 1.

Figure 2. Expected study flow chart

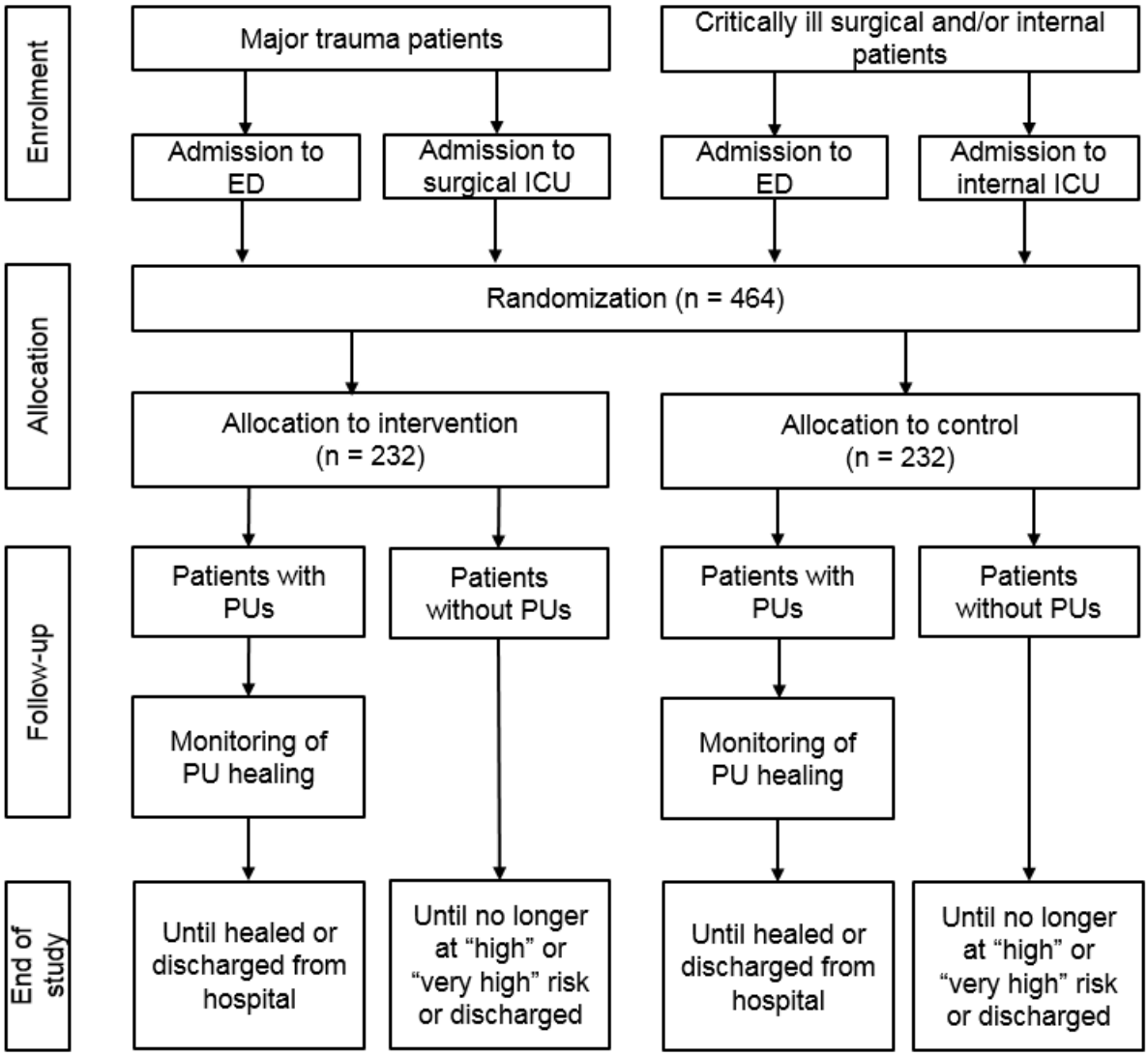


Table 1. Patient timeline

	Admission to ED and/or ICU	Follow-up	…	End of study
Days	D0	D1	D1 + 1	D1 + x
In-/exclusion criteria	X	X		
Informed consent	X*	X*	X*	X*
Demographics	X			
Skin inspection	X	X	X	X
Randomization	X			
Application of dressings	X			
Control of dressing fit/renewal	←	—	→	
All other clinical variables	X	X	X	X
Ressource use (number of dressings, wound care materials)	X	X	X	X
Adverse events monitoring and documentation	←	—	—	→

*Informed consent will be sought as soon as possible after inclusion.

3.6 Sample size

We are planning a study of independent cases and controls with 1 control per case. Prior data of the internal quality management indicate that the average PU incidence at the ICUs of the Charité is 0.06 per month. We expect that the cumulative PU incidence for experimental subjects will be 0.01 (RR 0.17). In order to test this hypothesis we will need to study 211 experimental patients and 211 control patients to be able to reject the null hypothesis that the PU incidence in the intervention and control groups is equal with a probability (power) of 0.8. The Type I error probability associated with this test of this null hypothesis is 0.05 (two-sided). We will use the chi-squared test statistic to evaluate this null hypothesis. To prevent a possible loss of follow-up of 10%, 464 patients in total are to be included. This total sample size is comparable to a previous trial using a similar intervention and design (Santamaria et al. 2013a). The “true” PU heel and sacral PU incidence in the study might be higher, because we will include only “high” and “very high risk” patients.

3.7 Recruitment

Patients will be recruited via three different approaches:
(1) Major trauma and/or critically ill patients admitted to the ED will be screened for in- and exclusion criteria at the ED. If being eligible they will be included and randomized.
(2) Major trauma and/or critically ill internal patients who are directly admitted to the respective ICUs. Immediately after admission they will be screened and eventually included.
(3) Major trauma and/or critically ill internal patients who are admitted through an in-house hospital transfer to the respective ICUs. Immediately after admission to the ICU they will be screened and eventually included.

The planned study flow chart is displayed in Figure 2.

It is planned to recruit patients at the:
• Internal (CC 11 Cardiovascular Diseases) and surgical (CC 9 Traumatology and Reconstructive Surgery) EDs
• ICUs 8i and 14i (CC 7 Anaesthesiology, Operating-Room Management and Intensive Care Medicine)
• ICU 9i (CC 8 Surgery)
• ICUs 43a, 43b, 47i (CC 13 Internal Medicine with Gastroenterology and Nephrology)
All departments and wards are situated at the Campus Virchow at the Charité-Universitätsmedizin Berlin.

Practical recruitment will follow two main strategies:
(1) Participating wards and departments contact the study nurses/research assistants/researchers immediately after admission of patient potentially meeting the inclusion criteria between 7:00 and 19:00 (Monday to Sunday). In that case the study personnel will immediately approach the patient and performs the screening. If eligible, the patient is included, randomized and the intervention (in the intervention group only) is applied.
(2) Study personnel will do walk rounds and visits on all participating wards and department between 7:00 and 19:00. Because patients will be included within 6 hours after admission to the respective ICUs, it is possible to cover a recruitment time per day from approximately 1:00 to 19:00 (18 hours). If eligible patients are detected, screening is conducted and the patients are potentially included.
Based on the number of departments and wards and the corresponding cases per months according to the hospital statistics it is assumed, that enough patients can be recruited within the given time frames.

4 Methods: assignment of interventions

4.1 Assignment of interventions

A simple randomisation with a 1:1 allocation as per computer generated randomisation table will be used. The randomisation table will be created at the Department of Biometry and Clinical Epidemiology independently from the CRC.

4.2 Allocation concealment

Sequentially numbered opaque sealed envelopes containing the group assignment will be prepared and used. Envelope preparation will be done by the data manager of the CRC who is not involved in any study preparation or procedures at this stage.

4.3 Allocation implementation

The batch of sequentially numbered envelopes is stored at the CRC. At the morning of the daily recruitment times from 7:00 to 19:00 approximately 5 to 8 consecutive envelopes are taken and potentially used during the day. If screening reveals eligibility for the trial, the next numbered envelope will be opened by the study personnel and the patient is assigned.

4.4 Blinding

Due to the nature of the intervention caregivers (e.g. nurses, doctors) and study assistants/researchers will not be blinded. The data manager will be blinded. Emergency unblinding is not foreseen.

5 Methods: data collection, management, analysis

5.1 Data collection and management

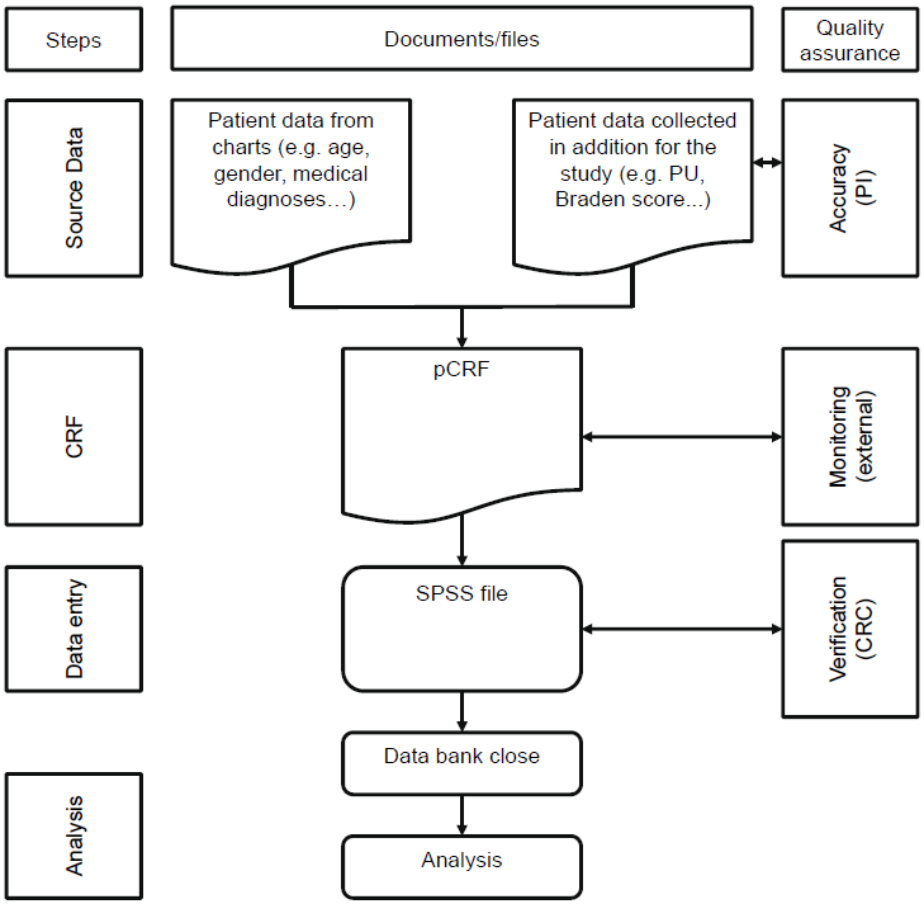
All data collectors will be trained in obtaining accurately the variables of interest (see 4.4). The six category PU classification system endorsed by the NPUAP/EPUAP (2014) will be used. The interrater agreement will be tested prior and during the trial using PUCLAS3 (Beeckman, Schonhoven 2014).

Paper source data (SD) and paper case report forms (CRFs) will be used to document all study variables of interest. All available routine patient documentation will be used as SD. This information will be obtained either from paper or electronic charts. SD collected explicitly for the study in addition to the routine documentation will be (based on 4.4):

- PU categories at heels and sacrum
- Resources associated with heel and sacral PU prevention and treatment
- Heel and sacral PU healing times
- Braden score
- Support surface
- Positioning

After SD verification via external monitoring (approximately 10%) pCRFs will be transmitted to the data manager. The data manager creates an SPSS file and data of the pCRFs are entered (single data entry). After data are entered, a random subset will be verified by an independent person (SD verification) who was not involved in the data entry so far. A summary of the data collection and management process is shown in Figure 3.

Figure 3. Data collection and management



5.2 Statistical methods

Depending on the level of measurement (nominal, ordinal, continuous) variables will be described using absolute and relative frequencies or arithmetic means, medians and spread parameters (minimum, maximum, interquartile ranges, standard deviations). Baseline demographic (age, gender, PU risk etc.) and clinical characteristics (e.g. medical diagnoses, duration of ventilation) of each group will be displayed in a table.

The primary end point PU incidence category II, III, IV, DTI at heels and/or sacrum will be compared using a Chi-squared test. This will be the main analysis of this primary outcome. A logistic regression will be applied to adjust for baseline covariates. An alpha level of 5% (two-sided) will be applied. Kaplan-Meier analyses and logrank test will be used to compare the times to development of a new PU between groups. Multiple Cox regression analysis will be performed to adjust for potential confounders. Data will be analysed as intention to treat.

Secondary outcomes will be analysed in a similar way. Depending on the level of measurement (nominal, ordinal, continuous) secondary outcomes will be described using absolute and relative frequencies or arithmetic means, medians and spread parameters (minimum, maximum, interquartile ranges, SDs). Chi-squared or t-tests will be applied to compare groups. In case of normality assumption being violated, the Mann-Whitney U test will be used instead of t-test.

For daily measurements, missing values will be imputed via LOCF method, and the results will be compared to those without imputation.

A cost effectiveness analysis (CEA) comparing both groups will be conducted. Quantities of used preventive dressings including labor costs for application in the intervention group and quantities of used PU treatment materials (e.g. dressings, time) will be documented. Current market prizes in Euro will be used to calculate the total costs per group. An incremental cost effectiveness ratio (ICER) will be calculated by dividing the mean differences in costs by the mean differences in effects. In order to make results comparable a similar approach like the work by Santamaria et al. 2013b will be used.

All analytic steps including the CEA will be repeated for the two subgroups heel PUs and sacral PUs.

6 Methods: monitoring

6.1 Data monitoring

A formal data monitoring committee will not be implemented.

6.2 Interim analysis

One interim analysis will be done after 50% of the sample (n = 232) have completed the study. The study will be stopped when there appears to be a negligible chance of demonstrating superiority if enrolment is fully completed. After the interim analysis the study will be stopped, if the conditional power (CP) based on the observed data after 50% of recruitment is less than 60% to reject the null hypothesis, that incidences in both arms are equal (Lachin 2005).

6.3 Harms

Within this trial the following definitions of adverse events will be used:

Device Deficiency (DD)

Inadequacy of a medical device with respect to its identity, quality, durability, reliability, safety or performance.

Note: Device Deficiencies include malfunctions, use errors, and inadequate labelling. All Device Deficiencies that could have led to a Serious Adverse Device Effect shall be reported in accordance with Serious Adverse Event reporting procedures.

Adverse Event (AE)

Any untoward medical occurrence, unintended disease or injury, or untoward clinical signs (including abnormal laboratory findings) in subjects, users or other persons, whether or not related to the investigational medical device.

Note: This definition includes events related to the investigational medical device or the comparator. This definition includes events related to the procedures involved. For users or other persons, this definition is restricted to events related to investigational medical devices.

Adverse Device Effect (ADE)

Adverse Event related to the use of an investigational medical device

Note: This definition includes adverse events resulting from insufficient or inadequate instructions for use, deployment, installation, implantation, or operation, or any malfunction of

the investigational medical device. This definition includes any event resulting from use error or from intentional misuse of the investigational medical device.

Serious Adverse Event (SAE)

Adverse Event that:

i. leads to death;

ii. leads to a serious deterioration in the health of the subject, that either resulted in;
   a. a life-threatening illness or injury, or
   b. a permanent impairment of a body structure or a body function; or
   c. prolonged hospitalization; or,
   d. medical or surgical intervention to prevent life-threatening illness or injury or permanent impairment to a body structure or a body function; or

iii. led to foetal distress, foetal death or a congenital abnormality or birth defect.

Note: Planned hospitalization for a pre-existing condition, or a procedure required by the CIP, without serious deterioration in health, is not considered a serious adverse event.

Serious Adverse Device Effect (SADE)

Adverse Device Effect that has resulted in any of the consequences characteristic of a Serious Adverse Event.

According to the Guidelines on Medical Devices (European Commission 2010) the above listed definitions only apply for non-CE marked devices and Conformité Européenne CE marketed devices outside the intended use. The silicone dressings used in this study are already CE marketed and are used within the intended use. Therefore formal reporting modalities do not apply. However, **(1) SAEs and (2) DD that might have led to a SAE will be reported not later than 2 calendar days to the manufacturer using the reporting form in Appendix 5.**

6.4 Auditing

The trial conduct is audited by an external monitor. The following processes will be reviewed:

- Patient enrolment/patient existence
- Consent
- Eligibility
- Allocation

7 Ethics and dissemination

7.1 Research ethics approval

The trial protocol and any amendments are prepared in accordance with the Declaration of Helsinki in the version of October 1996 (48th General Assembly of the World Medical Association, Somerset West, Republic of South Africa) and according to the SPIRIT guidance (Chan et al. 2013). This protocol and the informed consent form will be reviewed and approved by the responsible ethics committee. This study involves a medical device class IIb. Because the product is CE certified already an application to the Bundesinstitut für Arzneimittel und Medizinprodukte (BfArM) is not needed (see MPG-Law § 23b). An approval to conduct the study will be obtained from the local ethics committee of the Charité-Universitätsmedizin Berlin.

This study inclusion procedure is considered ethically sound, because adverse events by applying silicone dressings at heels and the sacral skin to prevent skin ulcerations have not been reported so far (Santamaria et al. 2013a, Clark et al. 2014). Based on existing evidence it is highly probable that the intervention has positive effects in maintaining skin and tissue integrity. This is also one reason, why the use of preventive dressings is considered as one of new PU prevention strategies in the latest PU prevention and treatment guideline (NPUAP, EPUAP, PPPIA 2014). Potential benefits clearly outweigh possible risks and therefore this study inclusion is justified.

7.2 Protocol amendments

The ethics committee will be informed about possible study amendments.

7.3 Consent

PU risk is highest during the first days of hospital admission. Critically ill and ICU patients are at especially high risk. Therefore it is important to start preventive interventions immediately after admission to the ED or to the ICU (within 6 hours). Patients meeting the inclusion criteria and who are able must provide written informed consent prior to participation. The informed consent form (ICF) will meet the requirements proposed by the ethics committee of the Charité. Patients being unconscious, ventilated, confused or are unable to give informed consent but meeting the inclusion criteria will be also included immediately. In that case informed consent from the legal representatives will be obtained as soon as possible. Individual consent will be sought in addition when patients subsequently regain capacity. If patients or legal representatives decide not to participate, all study data obtained so far are

deleted, the intervention will be stopped and PU preventive care procedures will be continued as usual. Any study participants or legal representatives can withdraw his or her consent at any time without giving reasons.

7.4 Confidentiality

All personal data are collected under pseudonymization. Each patient gets a distinctive subject number. The investigator administrates the subject identification list which includes the subject number as well as name, birthday, and address of the subject. The access to this is limited, only the Investigators as well as the authorized study staff, will have permission to inspect this list. All study-related information will be stored securely at the CRC. All participant information will be stored in locked file cabinets in areas with limited access. Electronical data are stored on a secured digital server of the Charité. An additional copy of the file is archived on CD-ROM together with the TMF and source data by the Charité.

7.5 Declaration of interests

Related to this PU trial the following possible conflicts of interests are disclosed:

• JK is member of the EPUAP executive board.

All other study team members have no possible conflicts of interest regarding PU research to declare.

7.6 Access to data

Because this is an IIS, the data is owned by the PI and therefore has full access.

7.7 Ancillary and post-trial care

Ancillary and/or post-trial care is not planed. All PU preventive and therapeutic interventions follow the clinical algorithms of the Charité-Universitätsmedizin Berlin. Trial participation will not lead to additional care.

7.8 Dissemination policy

A clinical study report will be prepared according to the ICH E3 guideline. Results will be also made available at the trial register clinicaltrial.gov. The study results will be presented in an international scientific journal following the guidance of the CONSORT 2010 statement (Schulz et al. 2010) and in at least one German speaking journal. Any publication will take account of the ‘Uniform requirements for manuscripts submitted to biomedical journals’.

Results will be presented as posters and orally at international conferences (e.g. the Annual Meeting of the European Pressure Ulcer Advisory Panel, EWMA conference) and at national German speaking conferences (e.g. Bremer Wundkongress, Jahrestagung des Deutschen Netzwerks Evidenzbasierte Medizin, Dreiländer-Kongress für Pflege und Pflegewissenschaft).

8 References

Institute for Applied Quality Improvement and Research in Health Care GmbH (AQUA). German Hospital Quality Report 2012. Göttingen.

Beeckman D., Schoonhoven L., European Pressure Ulcer Advisory Panel. PuClas3 eLearning Module. University Centre for Nursing & Midwifery and European Pressure Ulcer Advisory Panel. 2014.

Chan AW, Tetzlaff JM, Gøtzsche PC, Altman DG, Mann H, Berlin JA, Dickersin K, Hróbjartsson A, Schulz KF, Parulekar WR, Krleza-Jeric K, Laupacis A, Moher D. SPIRIT 2013 explanation and elaboration: guidance for protocols of clinical trials. BMJ. 2013;346:e7586.

Charité-Universitätsmedizin Berlin. Verfahrensregelung Dekubitusprophylaxe. 2012.

Clark M, Black J, Alves P, Brindle C, Call E, Dealey C, Santamaria N. Systematic review of the use of prophylactic dressings in the prevention of pressure ulcers. Int Wound J. 2014; 11(5):460-71.

European Commission. Guidelines on medical devices. Clinical investigations: serious adverse event reporting. 2010. http://ec.europa.eu/health/medical-devices/files/meddev/2_7_3_en.pdf

Hay RJ, Johns NE, Williams HC, Bolliger IW, Dellavalle RP, Margolis DJ, Marks R, Naldi L, Weinstock MA, Wulf SK, Michaud C, J L Murray C, Naghavi M. The global burden of skin disease in 2010: an analysis of the prevalence and impact of skin conditions. J Invest Dermatol. 2014;134(6):1527-34.

Kottner J, Lahmann N. [Comparative quality measurements part 3: funnel plots]. Pflege. 2014;27(1):41-9.

Kottner J, Raeder, K. Assessment and Documentation of Pressure Ulcers. In D.R. Thomas, G. Compton (eds.), Pressure Ulcers in the Aging Population: A Guide for Clinicians (p. 47-65). New York: Springer 2014.

Lachin LM. A review of methods for futility stopping based on conditional power. Stat Med 2005;24(18):2747-64

National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers: clinical practice guideline. Emily Haesler (ed.). Washington DC: National Pressure Ulcer Advisory Panel, 2014.

Park KH. The effect of a silicone border foam dressing for prevention of pressure ulcers and incontinence-associated dermatitis in intensive care unit patients. J Wound Ostomy Continence Nurs. 2014;41(5):424-9.

Santamaria N, Gerdtz M, Sage S, McCann J, Freeman A, Vassiliou T, De Vincentis S, Ng AW, Manias E, Liu W, Knott J. A randomised controlled trial of the effectiveness of

soft silicone multi-layered foam dressings in the prevention of sacral and heel pressure ulcers in trauma and critically ill patients: the border trial. Int Wound J. 2013a May 27. doi: 10.1111/iwj.12101.

Santamaria N, Liu W, Gerdtz M, Sage S, McCann J, Freeman A, Vassiliou T, Devincentis S, Ng AW, Manias E, Knott J, Liew D. The cost-benefit of using soft silicone multilayered foam dressings to prevent sacral and heel pressure ulcers in trauma and critically ill patients: a within-trial analysis of the Border Trial. Int Wound J. 2013b Oct 6. doi: 10.1111/iwj.12160.

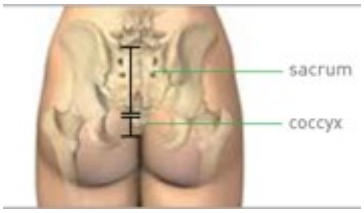
Schulz KF, Altman DG, Moher D; CONSORT Group. CONSORT 2010 statement: updated guidelines for reporting parallel group randomised trials. BMJ. 2010 Mar 23;340:c332. doi: 10.1136/bmj.c332.

Unbeck M, Sterner E, Elg M, Fossum B, Thor J, Pukk Härenstam K. Design, application and impact of quality improvement 'theme months' in orthopaedic nursing: a mixed method case study on pressure ulcer prevention. Int J Nurs Stud. 2013;50(4):527-35.

9 Appendices

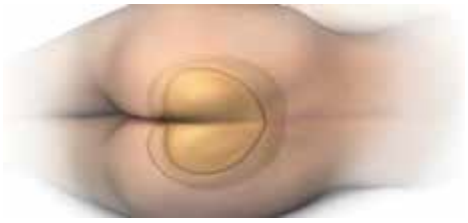
Appendix 1: Standard operating procedure to apply Mepilex® Border Sacrum on intact skin

Deutsch	English
Inhaltsverzeichnis **1. Beschreibung des Produkts** **2. Vorbereitungen** **3. Arbeitsschritte** **4. Besondere Anweisungen** **5. Mögliche Fehler/Störungen/Problem-Lösungen** **6. Lagerbedingungen / Reinigung**	**Table of Contents** **1. Description of Device** **2. Preparation** **3. Workflow** **4. Special Instructions** **5. Possible Error/Disruptions/Problem Solutions** **6. Storage Conditions/Cleaning**
1. Beschreibung des Produkts Mepilex® Border Sacrum ist ein Schaumverband zur Prävention und Behandlung von Dekubitus im Sakralbereich. Er ist weich, anpassungsfähig und wasserfest. Der Verbandswechsel erfolgt nahezu schmerzfrei und atraumatisch. Es verbleiben keine Rückstände auf der Haut. Der Verband wird alle 3Tage gewechselt.	**1. Description of Device/Hardware** Mepilex® Border Sacrum is a special foam dressing for prevention of sacral pressure ulcer. It is very smooth, flexible/adaptable and water-resistant. Changing is nearly painless and non-traumatic. Remove and replace dressing after 3 days.
Lieferumfang zum Produkt: / Delivery contents of the device: Mölnlycke Health Care Mepiplex® Border Sacrum • 18x18 cm Product code: 282000 • 23x23 cm Product code: 282400	
2. Vorbereitungen Bestimmte Standards sollen vor und während der Applikation eingehalten werden. a) Vorbereitung des Arbeitsplatzes: • Legen Sie sich zwei Schaumverbände bereit, • Ziehen Sie sich Handschuhe an, • Legen Sie sich bei Bedarf Waschlappen und Handtuch für die optimale Reinigung des Wundauflagegebietes bereit. b) Lagern Sie den Patienten bequem auf eine Seite, holen Sie bei Bedarf eine zweite Pflegekraft oder Lagerungsmittel zur Unterstützung. c) Stellen Sie sich einen Abwurfbehälter bereit.	**2. Preparation** A set of standards should be maintained before and during application. a) Prepare a place/table with all material: • Prepare two dressings, • Put on gloves, • For cleaning the wound area provide washcloth and towel (only if necessary) b) Place the patient on one site (support with pillows) maybe you need help of another colleague. c) Prepare a dustbin.

3. Arbeitsschritte	3. Workflow
a) Inspektion des Areals. Beurteilung der Anatomie des Patienten und Entscheidung welche Applikationsform in Bezug auf Lagerung und ggf. Einschränkungen (z.B. Inkontinenz) für den Patienten in Frage kommt. (Variante A oder B in Schritt e).	a) Area to protect. Assess the patient's anatomy and evaluate if the dressing should be placed according to Figure A or B based on coverage and/or potential issues with incontinence.
	
b) Stellen Sie sicher, dass die Haut frei von Dimethicone, Schutzfilmen und Salben ist. Entfernen Sie die Mitteltrennfolie des Verbandes. Das vorherige applizieren von Hautschutzprodukten ist nicht notwendig.	b) Ensure the skin is dry and free of dimethicone, skin sealants, emollients and remove the central release film. Use of skin barrier under dressing is not necessary.
	
c) Mit Hilfe eines Kollegen applizieren Sie den Wundverband in den Sakralbereich und der Analfalte, indem eine Gesäßhälfte leicht nach oben gezogen wird.	c) With assistance from a colleague, hold buttock apart. Apply dressing to sacral area and into upper aspect of gluteal cleft.
	
d) Ziehen Sie nacheinander die seitlichen Schutzfolien langsam ab und streichen Sie den Schaumverband nach außen hin aus. Überprüfen Sie, ob der Verband richtig positioniert ist sowie faltenfrei und fest an der Haut haftet.	d) Run side of hand along gluteal cleft to ensure secure placement. Gently smooth each side into place.
	

e) Variante A – Produktapplikation/ Figure A - Product placement.

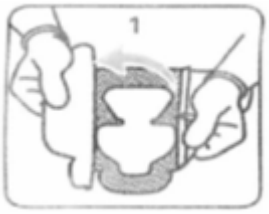
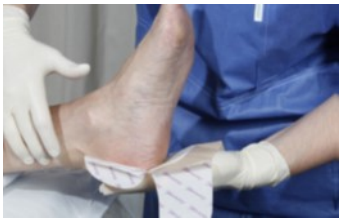
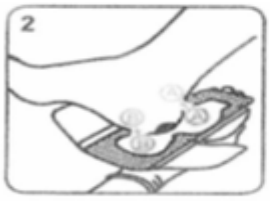
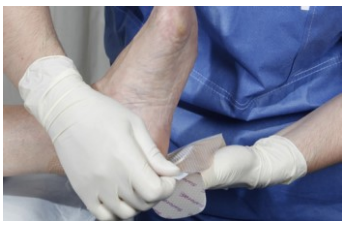
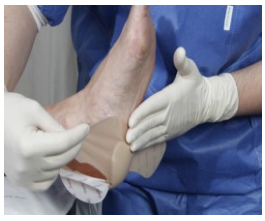
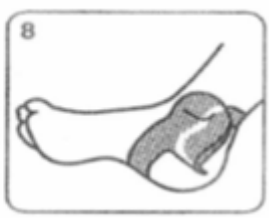
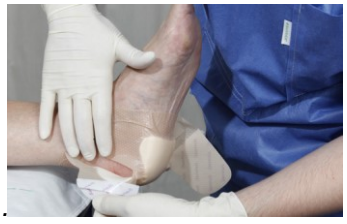
e) Variante B – Produktapplikation/ Figure B - Product placement inverted.



f) Lagern Sie den Patienten in seitlicher Position oder auf den Rücken.	f) Remove the patient in a site or back position
4. Besondere Hinweise a) Tägliche Überprüfung des Verbandes und Dokumentationsführung. b) Achten Sie darauf, dass die Verbandränder bei Entfernung oder Erneuerung des Schaumverbandes faltenfrei, glatt und fest kleben. c) Der Verbandwechsel erfolgt alle 3 Tage und so lang der Patient einem Risiko ausgesetzt ist.	**4. Special Instructions** a) Daily assessment of the dressing and documentation. b) Removal and reapplication of dressing. Ensure the border of the dressing is smooth/even with no wrinkles. c) Remove and replace dressing after 3 days as long as the patient is still at risk.
5. Mögliche Störungen / Problemlösungen a) Die Auflagefläche muss trocken und frei von Pflegeprodukten und eventuellen Pflasterresten sein, damit der Schaumverband gut auf der Haut haftet. b) Keine zusätzlichen Pflegeprodukte verwenden.	**5. Possible Error / Problem Solutions** a) The application area must be dry and free of dimethicone, skin sealants, emollients and remove the center release film for good adhesion. b) Don't use any other additional products.
6. Lagerung und Reinigung a) Gestalten Sie Ihren Arbeitsplatz übersichtlich und sauber. b) Lagern Sie die Wundverbände (Mepiplex® Border Sacrum) trocken und bei Raumtemperatur.	**6. Storage Conditions/Cleaning** • Clean and tidy up your workplace • Store the dressings Mepiplex® Border Sacrum at room temperature in a dry place.

Appendix 2: Standard operating procedure to apply Mepilex® Border Heel on intact skin

Deutsch	English
Inhaltsverzeichnis **1. Beschreibung des Produkts** **2. Vorbereitungen** **3. Arbeitsschritte** **4. Besondere Anweisungen** **5. Mögliche Fehler/Störungen/Problem-Lösungen** **6. Lagerbedingungen / Reinigung**	**Table of Contents** **1. Description of Device** **2. Preparation** **3. Workflow** **4. Special Instructions** **5. Possible Error/Disruptions/Problem Solutions** **6. Storage Conditions/Cleaning**
1. Beschreibung des Produkts Mepilex® Border Heel ist ein speziell an die Fersenform angepasster Schaumverband. Er ist weich, gut anpassungsfähig und wasserfest. Der Verbandswechsel erfolgt nahezu schmerzfrei und atraumatisch. Der Schaumverband ist selbsthaftend. Eine sekundäre Fixierung ist nicht erforderlich, sodass keine Rückstände auf der Haut verbleiben. Der Verband wird alle 3 Tage gewechselt.	**1. Description of Device** Mepilex® Border Heel it is a special foam dressing for prevention of heel area pressure ulcer. It is very smooth and flexible/adaptable and water-resistant. Changing is nearly painless and non-traumatic. Remove and replace dressing after 3 days.
Lieferumfang zum Produkt: / Mölnlycke Health Care Mepiplex® Border Heel • 18,5cm x 24cm	**Delivery contents of the device:** 
2. Vorbereitungen Bestimmte Standards sollen vor und während der Applikation eingehalten werden. a) Vorbereitung des Arbeitsplatzes: • Legen Sie sich zwei Schaumverbände bereit, • Ziehen Sie sich Handschuhe an, • Legen Sie sich bei Bedarf Waschlappen und Handtuch für die optimale Reinigung des Wundauflagegebietes bereit. b) Lagern Sie den Patienten/Probanden bequem auf eine Seite, holen Sie bei Bedarf eine zweite Pflegekraft oder Lagerungsmittel zur Unterstützung.	**2. Preparation of measurement** A set of standards should be maintained before and during the application. a) Prepare a place/table with all material: • Prepare two dressings, • Put on gloves, • For cleaning the wound area provide washcloth and towel (only if necessary). b) Place the patient on one site (support with pillows) maybe you need help of another colleague. c) Prepare a dustbin.

c) Stellen Sie sich einen Abwurfbehälter bereit.	
3. Arbeitsschritte a) Inspektion der Ferse, entfernen Sie die Mitteltrennfolie. Säubern Sie bei Bedarf das Wundauflagengebiet, achten Sie darauf, dass die Haut trocken ist.  	**3. Workflow** a) Remove the central release film. Assess application area (heel area). 
b) Legen Sie den Schaumverband auf das Fersengebiet und entfernen Sie die Schutzfolie (markiert mit „B“).   	b) Apply the adherent part of the dressing marked “B” in the instructions for use illustration under the foot. Do not stretch. 
c) Entfernen Sie nacheinander die Folie von den Seitenflügeln des Verbandes und fixieren ihn faltenfrei. Verband nicht auseinander ziehen!   	c) Remove the side flap protection film. Apply and smooth side-flap. Repeat with the other side. Do not stretch.  
d) Ziehen Sie die restliche Schutzfolie auf beiden Seiten des Verbandes ab (markiert mit „A“) und fixieren ihn, wie auf der Abbildung dargestellt, unterhalb der Achillessehne. Verband nicht auseinander ziehen!   	d) Apply the adherent part of the dressing marked A on the instructions for use illustration on the Achilles’ tendon. Remove the upper protection films on each side, apply, and smooth the dressing. Do not stretch. 
e) Lagern Sie den Patienten in seitlicher Position oder auf den Rücken.	e) Remove the patient in a site or back position.

4. Besondere Hinweise a) Tägliche Überprüfung des Verbandes und Dokumentationsführung. b) Achten Sie darauf, dass die Verbandränder bei Entfernung oder Erneuerung des Schaumverbandes faltenfrei, glatt und fest kleben. c) Der Verbandwechsel erfolgt alle 3 Tage anhand des Wund-Assessments und so lang der Patient einem Risiko ausgesetzt ist.	**4. Special Instructions** a) Daily assessment of the dressing and documentation. b) Removal and reapplication of dressing. Ensure the border of the dressing is smooth/even with no wrinkles. c) Remove and replace dressing after 3 days as long as the patient is still at risk, replace dressing according to schedule on the Wound Assessment Form documentation.
5. Mögliche Störungen / Problemlösungen a) Die Auflagefläche muss trocken und frei von Pflegeprodukten und eventuellen Pflasterresten sein, damit der Schaumverband gut auf der Haut haftet. b) Keine zusätzlichen Pflegeprodukte verwenden.	**5. Possible Error Messages/ Disruptions/ Problem Solutions** a) The application area must be dry and free of dimethicone, skin sealants, emollients and remove the center release film for good adhesion. b) Don't use any other additional products.
6. Lagerung und Reinigung a) Gestalten Sie Ihren Arbeitsplatz übersichtlich und sauber. b) Lagern Sie die Wundverbände (Mepiplex® Border Heel) trocken und bei Raumtemperatur.	**6. Storage Conditions/Cleaning** a) Clean and tidy up your workplace b) Store the dressings Mepiplex® Border Heel at room temperature in a dry place.

Appendix 3: Patient card

CHARITÉ

Dieser Patient/ diese Patientin nimmt an der Studie zur Dekubitus-Prävention teil!

1. **Bitte achten Sie darauf, dass die Silikonverbände an Fersen und dem Sakralbereich glatt und fest kleben.**

2. **Inspizieren Sie die Verbände bei jedem Lagerungswechsel. Achten Sie bitte darauf, dass die Verbandränder faltenfrei kleben.**

3. **Falls sich der Verband gelöst hat, bringen Sie bitte einen Neuen an und kontaktieren Sie uns!**

Vielen Dank!

Kontakt:
Klinisches Studienzentrum für Haut- und Haarforschung
Klinik für Dermatologie, Venerologie und Allergologie
Charitéplatz 1
10115 Berlin
E-Mail: anja.klasen@charite.de oder
elisabeth.hahnel@charite.de
Montag- Sonntag von 7:00 bis 19:00 Uhr
☎ 0152-25434224

Klinisches Qualitäts- und Risikomanagement

CLINICAL RESEARCH CENTER
FOR HAIR AND SKIN SCIENCE

Appendix 4: NPUAP/EPUAP pressure ulcer classification 2014

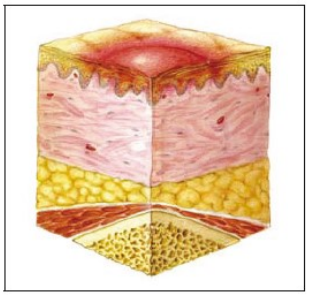
INTERNATIONAL NPUAP/EPUAP PRESSURE ULCER CLASSIFICATION SYSTEM

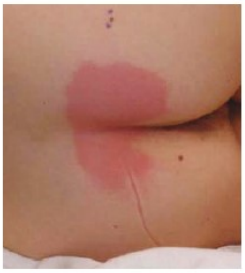
A pressure ulcer is localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear. A number of contributing or confounding factors are also associated with pressure ulcers; the significance of these factors is yet to be elucidated.

Category/Stage I: Nonblanchable Erythema

Intact skin with non-blanchable redness of a localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area.

The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue. Category/Stage I may be difficult to detect in individuals with dark skin tones. May indicate "at risk" individuals (a heralding sign of risk).



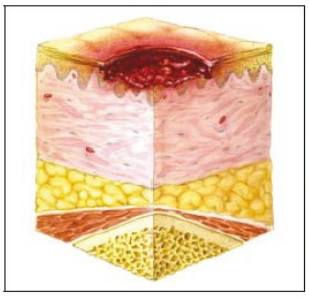


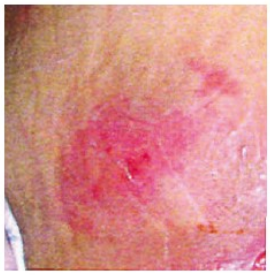
Category/Stage II: Partial Thickness Skin Loss

Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister.

Presents as a shiny or dry shallow ulcer without slough or bruising.* This Category/Stage should not be used to describe skin tears, tape burns, perineal dermatitis, maceration or excoriation.

**Bruising indicates suspected deep tissue injury.*

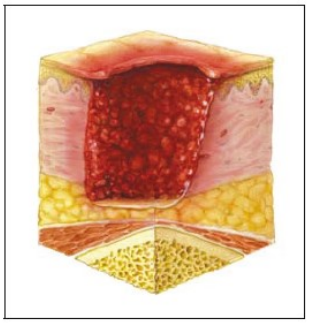


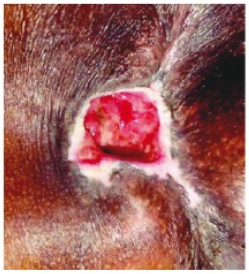


Category/Stage III: Full Thickness Skin Loss

Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling.

The depth of a Category/Stage III pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and Category/Stage III ulcers can be shallow. In contrast, areas of significant adiposity can develop extremely deep Category/Stage III pressure ulcers. Bone/tendon is not visible or directly palpable.

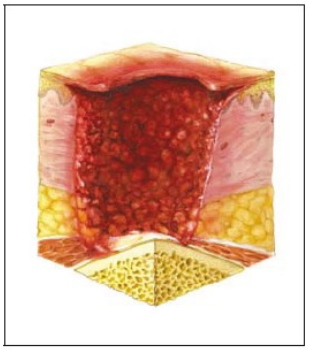




Category/Stage IV: Full Thickness Tissue Loss

Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling.

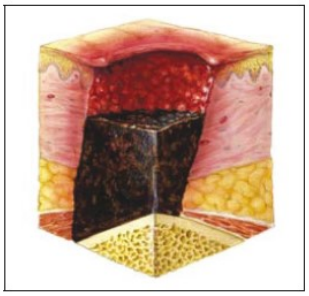
The depth of a Category/Stage IV pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and these ulcers can be shallow. Category/Stage IV ulcers can extend into muscle and/or supporting structures (e.g., fascia, tendon or joint capsule) making osteomyelitis possible. Exposed bone/tendon is visible or directly palpable.

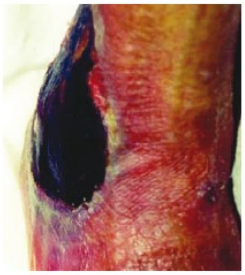


Unstageable: Depth Unknown

Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed.

Until enough slough and/or eschar is removed to expose the base of the wound, the true depth, and therefore Category/Stage, cannot be determined. Stable (dry, adherent, intact without erythema or fluctuance) eschar on the heels serves as 'the body's natural (biological) cover' and should not be removed.

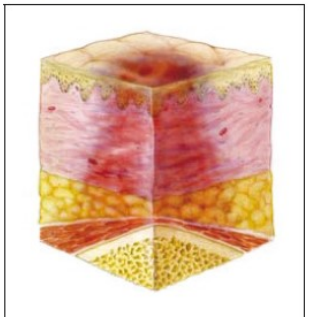


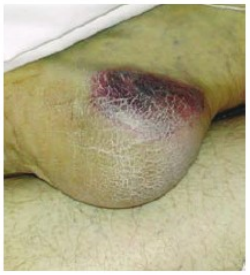


Suspected Deep Tissue Injury: Depth Unknown

Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue.

Deep tissue injury may be difficult to detect in individuals with dark skin tones. Evolution may include a thin blister over a dark wound bed. The wound may further evolve and become covered by thin eschar. Evolution may be rapid exposing additional layers of tissue even with optimal treatment.





Appendix 5: SAE Reporting form

MEDDEV 2.7/3 SAE Report Table- V1

EUDAMED - ID:	
Title of Clinical Investigation:	
CIP Number:	
Contact person (Name, Address, E-Mail, Telephone Number)	Device type:
MS+NCA Reference Numbers for all participating Countries:	**Reference Member State:**
No. of Patients enrolled to date (date of report):	**No. of Invest. Devices used to date**
Date of Report:	

Status: a, m, u	Date Sponsor received Report of SAE	Country	Study Center	Patient ID Code	Date of Procedure/ First Use	Date of Event Onset	Event: Organ System	Description of event	action/ treatment/patient outcome	Assessment of Relationship to Procedure: Yes No Possibly	Assessment of Relationship to Investigational Device: Yes No Possibly	Unanticipated SADE yes/No	Treatment Arm: Investigational Device/ Control Group/ blinded/ n.a.	Event Status: Resolved/ Resolved with Sequelae/ Ongoing/Death	Date of Event Resolution

Note: Submission of this report does not, in itself, represent a conclusion by the sponsor or the competent authority that the content of this report is complete or that the device(s) listed failed in any manner and/or that the device(s) caused or contributed to the alleged death or deterioration in the state of the health of any person.