

WHASA consensus document on the management of pressure ulcers

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INTRODUCTION

This consensus document of the Wound Healing Association of Southern Africa addresses ulcers related to pressure and shear force exerted on skin over bony prominences. Moisture related damage related to friction and maceration is dealt with in the document on skin assessment and surrounding stoma care.

To develop a Pressure Ulcer Consensus Document was our brief. One of the comments by a panel member on the first draft was that there are great tools already available as pressure ulcer guidelines and that those are updated frequently. In order not to re-invent the wheel we have realized that a pressure ulcer does not have a nationality but that it lives in a particular set of circumstances.

Existing guidelines from NPUAP/ EPUAP* is the backbone of level of pressure ulcer care we ultimately aim for in South Africa. Unfortunately a guideline if not adapted to a specific set of circumstances has limited value in application and translation into practice.

From the side of WHASA the approach for this specific pressure ulcer consensus document is to develop a robust pathway and vehicle that can deal with African circumstances strewn with poverty, ignorance, belief in local remedies and traditional medicine. An ordinary vehicle

Key message of this document:

This guideline is built on common sense and back to basics to establish an acceptable minimum standard of care to be rendered in resource limited environments and circumstances to the benefit and comfort of patients regardless of

socio-economic status.

cannot last 50 meters in this jungle. We need a ruff heavily studded off-road vehicle with suitable tyres, build on the solid science already known to us and have it robustly modified to suit Africa's need.

METHOD

An expert collaboration group from all walks of clinical care assembled for two day in Gauteng, South Africa to discuss and formulate a consensus document on the Management of Pressure Ulcers. Teams were selected for clinical expertise and background in General medicine practice, Wound management, Reconstructive Surgery, Product application and Managed Health Care.

The Pressure ulcer team consisted of members of whom 70.5% had more than 15 years of experience, 12.5% specialists and 50% of them in nursing practice dealing with Pressure ulcers on a daily basis. They have reviewed the current literature pertaining to their area of expertise and present their findings during the meeting in a structure based on the Wound Bed Preparation Paradigm*. The purpose was not to reinvent the wheel but rather to put forward the South African voice and experience within a list of recommendations. The list of recommendations was presented on day 2 to the full audience where a Modified Delphi method was used on the day to evaluate the recommendations of each team to generate at least an eighty percent immediate consensus for each recommendation.

As verification of this, an online-based modified Delphi method was used where each team member voted independently to verify the initially reached recommendation strength. Thereafter it was verified by an independent second panel consisting of national and international experts who were not part of the panel. A 4-point Likert scale (strongly agree, partially agree, partially disagree, strongly disagree) was used with space for individual comments. Each item to be included in this document has achieved eighty percent agreement (either strongly agree or partially agree) by all panels to be added in the final list of recommendations. This process took 24 months to complete.

CONTRIBUTORS

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RESULTS

1. Assess patient ability to heal and treat the cause

1A. How would you determine if there is adequate blood supply to the wound?

With pressure ulcers, the primary problem is not caused by a deficient blood supply but by a mechanical force limiting the local blood supply in this case, pressure and shear forces.*1

A local inspection of the surrounding skin of the ulcer may give a good idea of the perfusion to the ulcer if the pressure is relieved. Pink warm skin in Caucasians gives an indication of good perfusion.² Localized perfusion could also be determined by an ABPI test and trans cutaneous oximitry.*²

Central causes of poor perfusion should also be ruled out. Examples of these are hypotension, diabetes, smoking and hypercholesterolemia.* 3

Table 1: Blood perfusion

Blood perfusion influenced by:						
Mechanical factors decreasing flow	Oxygen carrying capability					
Continuous sustained pressure to the wounded area	Severe anaemia E.g.: Iron-, vitamin B12- and folic acid deficiency, sickle cell disease, acute blood loss events.					
Peripheral arterial disease.	Smoking habit elevating blood carbon dioxide blood levels, displacing oxygen.					
Decreased cardiac output. (Heart failure)	Blood diseases: polycythaemia caused by chronic lung disease (tuberculosis scar, chronic obstructive airway disease)					
Gross oedema increasing distance to tissue from source of blood supply.	Rare haemoglobin abnormalities					

Recommendation 1

Agreement: 96%

If there is healthy tissue around the pressure ulcer then we can assume that there would be adequate blood supply if the cause of the pressure ulcer is remedied.

1B. Identify the causes as specifically as possible and identify referral:

Table 2: Indications for referral

Staged Criteria	Causative factor	Referral
Stage 1	Moisture associated damage Friction	Care giver
Stage 2	Friction Moisture associated damage	Care giver/ Formal wound care
Stage 3	Pressure Shear	Formal wound care/ Physician input
Stage 4	Shear Pressure	Formal wound care/ Physician input
Unstageable	Shear Pressure Aggravating metabolic component	Interprofessional team
Deep Tissue Injury	Shear Pressure Aggravating metabolic component	Interprofessional team including critical care

The primary cause of a pressure ulcer is excess pressure on soft tissue overlying a bony prominence. The pressure causes the capillary perfusion of the soft tissue to be interrupted. If that is sustained for long enough, the tissue ischemia will lead to tissue death and breakdown, resulting in a pressure ulcer. Shearing forces on the soft tissue also could cause interruption of the blood flow to the tissue ending in tissue loss. Moisture and friction could also damage the skin that could be an aggravating factor in a pressure ulcer forming.¹

The BED SURFACE INTERFACE is the most important aspect in care of a patient with a pressure ulcer

What should be determined is what caused the prolonged pressure on the high risk area of the patient. This could be achieved with a good comprehensive history making use of the inter-professional team to gather as much information as possible from the home or caring environment the patient lived in. A targeted physical examination could also give an indication as to what action or position could have caused the excessive pressure. Another area that must be examined is the general physical health of the patient. Frail health could lead to immobility and poor tissue perfusion. That could then make the patients more susceptible for pressure ulcers to develop.^{4,5}

Recommendation 2 Agreement: 96%

A pressure ulcer is caused by pressure or shear forces on the soft tissue overlying a bony prominence.

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Recommendation 3

Agreement: 96%

The gold standard in bedding is high specification foam mattresses and reactive and active pressure relieving mattresses.

Recommendation 4

Agreement: 100%

The following are mechanical factors decreasing the volume of blood flow and should be controlled:

- Ineffective offloading
- Peripheral arterial disease
- Decreased cardiac output
- Gross tissue oedema either spontaneous or induced by medication
- Smoking causing peripheral vaso-constriction.

Recommendation 5 Agreement: 100%

- The following are factors decreasing oxygen carrying capability of blood.
- Severe anaemia (internal or external factors)
- Smoking (carbon dioxide displacing oxygen)
- Blood diseases like polycythemia and
- Other rare hemoglobin abnormalities.

4X4 Facts:

In resource poor environments a clinician is required to rely on senses as a guide. Make use of them all:

- Listen at what the patient and the family/care givers are communicating.
- Look at the whole patient and then at the wound.
- Touch the surrounding skin and the limbs.
- Smell the patient and the room.
- And only then speak.
- Review co-factors / co-morbidities (systemic disease, nutrition, medications) that may delay or inhibit healing:

Co-factors contributing to the formation of pressure ulcers could be divided into four groups as depicted in Table 3:

1D. Determine when the wound will be categorised as healable, maintenance and non-healable

A wound is **healable** when the body has the ability to heal and the environment is favorable to healing. That implies that if the cause of the pressure ulcer is removed, the ulcer would be able to heal. To determine that, the general health of the patient must be established as well as the local health of the tissue in the surrounding areas of

Recommendation 6

Agreement: 100%

- The following are factors impacting negatively on healing:
- Medication such as cortisone and anti-inflammatory agents
- Diseases like diabetes and hiv infection/aids.
- Cancer
- Severe acute illness
- Emaciation with malnutritionGross obesity
- Old age

the ulcer. Special consideration must be given to perfusion of the area adjacent to the pressure ulcer. Other important factors are drug use e.g.: steroids, edema, poor nutrition with a low albumin, anemia and systemic diseases such as Rheumatoid Athritis.^{8,9}

Cause can be corrected

A wound is **non-healable** when the body lost the ability to heal. With these wounds the body lost the ability to heal due to any of the causes mentioned above. These ulcers are present in pre-terminal patients.⁶ No healing will take place despite ideal healing conditions.^{8,9}

Cause cannot be corrected

A wound is in a **maintenance** state when the body is able to heal the wound but the environment prevents the healing to take place. Examples are in severely mal-nourished patients or patients who does not have access to effective offloading.^{8,9}

Cause can be corrected but patient or system issues prevents correction

Recommendation 7 Agreement: 100%

- For a pressure ulcer to be categorised as healable, two main factors have to be in place:
- The external cause of the pru must be corrected by effective offloading of the affected area.
- · The body must have the capability to heal the wound.

Recommendation 8

Pressure ulcers as maintenance wounds are much more frequent due to inability to achieve:

Agreement: 96% - 100%

Effective offloading

- Malnutrition status of the patient
- Incomplete control of/ or untreated underlying disease

Co-factor	Clinical effect	Examples
Environmental factors	Immediate care area supplying pressure for a prolonged period of time	Ineffective offloading support, ineffective offloading regimer and medical apparatus like tubes and splints. ^{5,7}
Systemic disease	Influence and impair the innate ability of the body to heal	Diabetes, HIV infection, AIDS advanced stage heart failure, anaemia, cancer etc. ^{5,6,7} Advanced organ involvement End stage of Life (SCALE)*
Local factors	Outside influences that interacts/ counteracts with the body defence mechanisms	Incontinence, (faecal of urine), excessive sweating, damagin the skin integrity, Immobility caused by paralysis, disease or injury. Smoking and the use of steroids and malnutrition. ^{4,5,7}
Patient centred factors	Understanding of the condition, cultural beliefs and traditions	Use of locally mixed remedies Nutritional status and willingness to change dietary habits Age

Table 3: Contributing factors in pressure ulcer etiology

Recommendation 9

Agreement: 96%

Some pressure ulcers will be non-healable despite effective wound care and off-loading due to an innate inability of the body to heal.

4X4 Facts:

A tragedy is the fact that it is easier to get a social grant with a pressure ulcer than without one. That gives rise to the huge burden of pressure ulcers that is kept in a maintenance category. Healing of the wound could create additional financial hardship for the family

2. Develop an individualised plan of care

To individualise a plan of care, the healthcare worker must first know the individual. To get a full understanding of the patient with a pressure ulcer, the multi-professional team must be used to determine what levels of care the patient has access to.¹⁰ The patient self should be questioned regarding his/her wishes and thoughts about the treatment plan. Taking all the information into consideration, a treatment plan must be developed that is effective in treating the patient with the ulcer, with the aim in healing the ulcer. The quality of life of the patient must be also be taken into consideration. The plan must also be realistic taking the logistic restraints into consideration. All the participants in the treatment of the patient must be privy to the details of the plan and must have input in the development of the plan.¹⁰

It is important that each participant must know his/her role in the plan. The progression of the plan must be constantly evaluated to determine if it is still in line with the aim of healing the wound. Feedback must also be given to the team members at regular intervals.¹⁰

Recommendation 10

Agreement: 100%

The assessment of patients with pressure ulcers to enable carers to reach the ideal conditions is dependent on an effective and integrated interprofessional team.

2A. Identify the cause and design a plan to treat the cause related to specific aetiology and diagnosis

Patients with pressure ulcers are different from other patients with chronic ulcers in the sense that they are dependent on others for help and basic care. To enable those caregivers to prioritize correctly, the use of **a risk assessment tool is recommended.** The Braden scale¹¹ to date has the highest validation for use in clinical practice and the tool of choice recommended in this document (Addendum 1). In using the scale, even on a patient with an existing pressure ulcer, the factors leading to the formation of the pressure ulcer could be systematically identified.

Sensory Perception or the lack thereof must be determined in each patient. The more the loss of sensation the more attention must be given to all the potential pressure areas to make sure that effective offloading is in place. This is also true for a pressure ulcer as well.¹⁶

Moisture management is imperative because too much moisture leads to the breakdown of the skin barrier and that could lead to slower or non-healing of current pressure ulcers or hasten the formation of new ones. Barrier creams, urine catheters, faecal diversion apparatus and absorbing dressings is of great use. Excessive exudate must also be effectively managed with drainage devices or absorbing dressings.¹⁵

Regular turning of a patient is imperative to prevent pressure damage. A 2 hour turning regimen is advocated. If possible, involve the patients in the regimen by letting them set an alarm and initiate the turn themselves. Full turns are not needed, only a relative change in position might be adequate incorporating the 30degree tilt mechanism.* The use of active or passive pressure mattresses also helps in the treatment and prevention of pressure ulcers *but it does not replace regular repositioning of a patient.* Variable density foams, memory foams and pillows could also be used for effective offloading.⁵

Malnutrition leads to poor tissue quality and poor healing ability in a patient. A dietician should be included in the inter professional team to help in addressing the nutritional needs of a patient.^{5,13} Obesity is also a risk factor for developing a pressure ulcer.¹⁴

The **friction and shear** forces a patient experiences are directly or indirectly caused by failure of the carers to effectively position or handle the patient. Education should be given to all who are part of the caring team on how to effectively offload a patient and also how to physically handle a patient to prevent friction and shearing forces to be present.¹²

The causes of the preceding problems should also be established as a priority and addressed as correctable or not. By giving attention to the Braden subscales factors, an optimal care environment can be created with focussed and active intervention on outlier factors.

Recommendation 11

Agreement: 96% - 100%

The following are special considerations in pressure ulcer care:

- Patients with pressure ulcers are dependent on others for help that may lead to depression and other psychiatric manifestations
- Attention must be given to moisture management and the prevention of skin damage as pru's are notoriously wet wounds or in proximity of body excreta.
- 2.C. Identify and design a plan to modify (if possible) systemic factors / co-factors that may impair healing.

Clearly identify the reason the immobility occurred that have led to the formation of a pressure ulcer. The cause may be transient (critical illness) that may be easier to correct or it may be permanent (paralysis due to a spinal injury). Each of these precipitating factors have co-factors and morbidities previously discussed that must be kept in mind. It is therefore important to precisely know what the cause of the immobility is.

Follow the Braden risk assessment data accumulated to give a clear systematic list of priorities to address. For a complete information set take a complete history to identify harmful habits, traditions and beliefs. Follow that with a thorough physical examination assessment to check for any medical problem or disease that could have been unidentified previously. Also include a complete skin assessment to identify any situation or condition that could impair healing of the ulcer.¹⁷ Using the multi-professional team is the easiest way to gather this information.

Recommendation 12

Agreement: 96%

With pressure ulcers the reason the ulcer developed remains when the ulcer is healed and the patient goes back into the same set of circumstances.

Continuing education must be given and support systems be set in place to prevent a recurrence.

A pressure ulcer will develop AGAIN if initial circumstances have not been addressed

3. Assess and support individualised patient centered concerns

3A. Pain

The presence of pain in a patient with a pressure ulcer might be an indicator of an inflammatory response, a dressing that causes discomfort or other local pathology. The experiencing of pain varies from person to person. It is therefore very important to determine the level of pain each patient experiences. This evaluation must take place before, during and after each dressing change.

As the age, literacy, language and intellect level of patients differ, is it important to use a proper measuring instrument which is most applicable for each patient. The instrument must be reliable and tested. Examples of some of these instruments are Wong-Baker FACES Scale and numerical rating scales.

Differentiate between nociceptive and neuropathic pain as the treatment differs. The management of pain rest on three legs. Firstly, a comforting non-threatening environment helps the patient to relax and the perception of pain is lessened. Secondly, determine the cause of the pain and treat it. Thirdly, treat the pain pharmacologically. This is done either topically with dressings or preparations that are in direct contact with the wound, or systemically via oral or parenteral analgesics.¹⁸

The experience of pain differs from person to person. It is therefore very important that pain assessment must be done before, during and after each dressing change.

Pain are also experienced differently by each patient. A validated pain scale applicable to each patient's cognitive abilities must be consistently used throughout the patient's treatment (eg. Wong Baker faces scale or the Visual Analogue Scale). The nature of the pain experienced must also be determined. This could help to determine the cause of the pain. Actions could be implemented to treat the cause if possible or specifically treat the type of pain the patient experiences. E.g.: Amitreptiline for neuropathic pain and NSAIM for nociceptive pain. The effective treatment of pain is essential as its continuous presence is detrimental in wound healing. With continuous pain the psychological health of a patient also deteriorates, leading to poor wound healing rates.

Shooting, stabbing, burning pain for neuropathic pain Throbbing, aching, gnawing pain for nociceptive pain. PAIN necessitates an immediate intervention

3B. Activities of Daily Living:

The use of the inter-professional team is the mainstay in management of the activities of daily living. The knowledge of the activities of daily living of a patient is very important as it have a profound impact on the quality of life of the patient.

Two sets of information has to be gathered. First of all, what the patient was capable of before the incident and secondly, what the patient is currently capable of doing and also trying to determine what the future experience of the patient might be. It is imperative that the patient functions at optimal level at each stage of the treatment of the disease as a positive mind set does increase the chance of healing of the wound.²⁰

Maximising ADL is of utmost importance to a patient with a pressure ulcer. The reason for that is twofold. Firstly any physical activity decreases the risk of pressure ulcers forming or getting worse as only a slight shift of position could lead to significant decreased in pressure on soft tissue. Secondly, physical activity leads to stress release, that then leads to a psychological healthier patient.

Recommendation 13

Agreement: 100%

A comprehensive history from the patient and/or family members is of immense value and could save a lot of time and effort during the treatment process.

3C. Psycho-social wellbeing

As the general health has an influence on the healing ability of the ulcer, so does the ulcer and all that is associated with it, has an effect on the patient. The factors affecting the patient might be the ulcer itself, e.g.: Offensive discharge or pain. The treatment, being cumbersome, and unsightly or the patient might feel shy for having an ulcer. All these factors could have a negative emotional effect on the patient. That lowers the quality of life of the patient. As we are striving to provide holistic care, therefore treat the patient in his/ her intierty, and not only the ulcer. Attention should be given to all these factors that could negatively impact in the quality of life of the patient.^{5,20}

In the Wound Bed Preparation Paradigm, patient centred concerns are given priority over local wound care. That is so for a reason. If the host is not psychologically and socially in optimal condition, the healing process of the wound will suffer.

3D. Smoking

Smoking is a major aggravating factor in chronic ulcer care outcomes. Smoking causes local vasoconstriction with resulting lower perfusion (20-40%) to the ulcer that could last for 60-90 minutes per cigarette smoked. Smoke also contains a myriad of toxins harmful to the body. There is no argument that could condone smoking and every effort should be made to give the patient all the relevant information to make an educated decision.²⁰

3E. Access to care, financial limitations

With fragmented access to care and financial limitations in place, a great divide becomes apparent. The existence of the public health system and the one hand and an insured health care mechanism on the other albeit each offering a pathway to care, may in many cases be the difference between healability and maintenance situations. Having access to a wide variety of dressing options usually comes at a price.

With a good solid scientific knowledge of pressure ulcer aetiology and it's pathogenesis a carer can though overcome dressing availability options and utilise what is available to the best advantage of the patient. With lesser resources though, greater personal commitment and time is needed. The social services system available as at the place of care, can be put in place as part of the care pathway.²⁰

4X4 fact

Specific attention should be given to the routine of care the patient received at home.

In this scenario, the social worker is of pivotal importance to the team. They know the patients personally the best in their home settings. They also have knowledge of all the grants and systems available to help to develop a successful treatment plan.

What should comprise education and support to persons and their circle of care (including referral) to increase adherence (coherence) to the treatment plan.

When educating a patient, the carer has to have clear knowledge on what the education and intellectual levels are that the patient is functioning on. That will determine what level of education is necessary and what education tools need to be implemented. Patients and their respective families should receive information regarding the causes of pressure ulcers in general as well as the specific identified cause of the pressure ulcer that is to be treated. The treatment plan developed for the patient, as well as the followup aftercare should be fully explained to give a clear estimate of the time involved in the care required for the patient. Emphasis should be put on strategies to prevent a recurrence of the pressure ulcers as well as the assessment of the skin to predict the risk of forming another pressure ulcers. This information package should be available to the family and the carers at home in a format of home language and easy readability.^{7,21}

Family, friends, home base carers, community groups and religious affiliations should be used to support the patient. Each of these groups should have access to information regarding the pressure ulcer and treatment relevant to the role they are playing in the convalescence pathway of the individual patient.²² Specific instructions regarding the wound care and offloading as well as the rationale behind the treatment regimens are the crucial education elements to be explained and reach consensus on with the immediate care team.

The level of support given to the patient and family depends on the support systems already in place. Again, the role the social worker plays is paramount in gathering the correct information.

5. What elements should be part of how this wound category should be assessed and which elements of the wound history and physical examinations should receive additional attention?

In the assessment of a patient with a pressure ulcer the Wound Bed Preparation Paradigm could be used. With this paradigm attention is first given to the patient, determining the primary cause of the ulcer and assessment of mechanical forces present. The general physical health of the patient is determined. The effect of the ulcer on the patient is then evaluated. Only then are attention given to the ulcer itself.⁹

The crucial decision to make first and foremost is to determine the wound healability status of each wound as that will determine intervention priorities regarding debridement, infection control and moisture balance issues.

6. How should wounds in this categroy be cleansed?

Chronic wounds are not sterile and does not need to be sterile to heal.¹ All effort should be taken to prevent damage to the healthy granulation tissue when cleansing the wound and to date the debate exist that cleansing is not directly advantageous to wound healing outcomes. Cytotoxicity should be avoided by not using alkaline soaps and cleaners in healable wounds. The peri-wound skin can be cared for with a pH neutral skin cleanser.²

All reasonable measures should be taken to prevent contamination of the wound area with feces or urine and in cases of contamination cleansing is of paramount importance to the wound bed and surrounding skin.⁵ When the patient, wound or environment is not compromised, clean wound management techniques could be used and may cleansing be approached in using body temperature potable water.³ In a compromised situation, aseptic wound management techniques should be used and should all cleansing fluids be sterile from onset.⁴

Special considerations are pressure ulcers that are classified as maintenance or unhealable wounds. Here the aim shifts from healing the wound to prevention of infections. These wounds could be covered with a thin layer of painted iodine solution. Although it could be cytotoxic the antiseptic benefits directly on the wound bed outweighs the risk of developing a deep tissue infection.

Recommendation 14

Agreement: 54% - 96%

If excess fluid, debris or contamination with faeces is present in the not infected pressure ulcer, the following cleansing options would be adequate:

- Wiping the excess away with a dry gauze swab (60.8%)
- Rinsing with potable water (95.8%)
- Potable water compresses on the wound bed for 5 minutes (52.1%)

Recommendation 15

Agreement: 75%

Special considerations in cleansing exist for pressure ulcer wounds that are classified as iodine maintenance or unhealable. These wounds could be painted with betadine solution and covered with a dry non-interactive dressing. Here the aim shifts from healing the wound to prevention of infections.

4X4 fact

Potable water is available in every care setting. Use it in non-compromised patient wound care.

7. How should debridement be approached?

Debridement is the method of choice (summarized in table 4) for removing non-viable tissue in HEALABLE PRESSURE ULCERS that contains either dead or devitalised tissue, excess exudate, bacteria, non-functional fibroblasts and keratinocytes.⁶ Devitalised tissue inhibits wound healing because it masks or mimics wound infection, serves as a nutrient source for bacteria, acts as a physical barrier to healing and it may produce inflammatory cytokines prolonging or stalling the wound healing process in the late inflammatory phase.⁶

Recommendation 16 Agreement: 100%

Effective debridement is essential in patients with healable pressure ulcers.

Factors to take into account for choice of debridement method are: $^{\!\!\!\!2,6,7}$

Skill levels of care givers, Resources available, Healability status of patient, Patient preference, Pain caused, Location of the ulcer, Logistics surrounding the care environment and pathway.

Sharp debridement should be carried out by a suitably trained clinician with competence.

8. How would you assess and treat the wound for superficial critical colonisation / deep infection / abnormal persistent inflammation or persistent inflammation?

How to make the final decision in determining wound infection is dependent on the clinical assessment, pain present and the optimal use of verified criteria that can separate chronic wound infection situations from those indicating acute wounds with markers known to all (swelling, redness, warmth, exudate and loss of function). For the purpose of this document the proposed NERDS and STONEES criteria as validated by Sibbald et al* is the criteria of choice in the management of pressure ulcers either in hospital or at home. Clinical assessment can be more directed towards appropriate and sensitive antibiotic treatment with tissue biopsy or MC&S results.

Persistent inflammation should be suspected when wound healing is stalled without NERDS or STONEEES present. A Blood test is now available to confirm the diagnosis.¹¹

Table 4: Debridemen	t options f	or healable	pressure ulcers
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	Mechanisms and rationale	Healable wounds	Maintenance wounds	Non-healable wounds
Surgical/ Sharp debridement	Sharp : Non-viable tissue are removed with a sharp instrument to just before bleeding tissue Surgical : Non-viable tissue and some viable tissue are removed with sharp instruments up to bleeding. High skill levels are needed. Indicated when debridement is urgent ² . Delivers a quick result.	Indicated: Sufficient blood flow is present Associated with wound related pain	{ }	Contra-indicated: Absent blood supply
Mechanical	Non-selective method of debridement. Needs expertise and resources. Fast acting	Indicated with caution: Not patient friendly Associated with wound related pain, bleeding and wound bed trauma	{ }	Contra-indicated: Prevent trauma
Autolytic	Selective Not painful. Low levels of expertise and resources needed. Not suitable for wounds with deep infection.	Indicated: Time consuming Not painful	<)	Contra-indicated: Keep dry
Enzymatic	Selective debridement. More expensive than autolytic debridement. Low skill level needed. Faster than autolytic debridement Slower than sharp or mechanical debridement. Daily application for a restricted period of time (7-14 days)	Indicated: Might cause wound related pain	{ }	Contra-indicated: Enlarge the already existing wound
Biological (Maggot debridement therapy with species <i>Lucillia</i> <i>sericata</i>)	Highly selective Low skill level. Cost implication. Patient resistance Contra-indicated in highly exuding wounds	Indicated: Salivary growth factors deposited Mostly painless	{ }	Contra-indicated: Loss of the protective necrotic layer

Superficial infection/Critical colonization (NERDS)¹ Non healing wound Exudative wound Red friable granulation tissue Debris on wound surface Smell or odor

Deep infection (STONEES)¹

Size increased

Temperature of surrounding skin increased

Os – open exposed tendon or bone

New areas of breakdown

Erythema

Exudate/Oedema

Smell or odour

Recommendation 17

Agreement: 100%

It is important to distinguish between superficial infection/critical colonisation and deep/systemic infection in pressure ulcer care.

4X4 fact

NERDS and STONEES criteria is free. Use it! Remember also that Doxycycline and Ibuprofen does have anti-inflammatory properties

9. How would you select a dressing to match the appropriate wound and individual person characteristics?

The choice of dressing are influenced by the following factors:

- Moisture balance of the wound: If too wet, use an absorbent dressing. If too dry, use a dressing that donates moisture.^{14,15}
- Presence of dead tissue: Use a dressing that donates moisture

to the wound if autolytic debridement are used as a means to achieve debridement.¹⁴

- Infection, either superficial or systemic: Use dressings that contains antimicrobial agents.¹⁴
- Pain: Some of the ointments can sting when applied. Other could adhere to the wound if allowed to dry out. They could cause pain on removal of the dressing. Analgesic dressings are nowadays available.¹⁴
- Odor control: Use metronidazole gel on the wound if odour is a problem. If that is too expensive, metronidazole could be given orally. Beware not to crush the tablets and put the powder in the wounds as that could pose a health risk to the carer.^{8,13,14}
- Social acceptability: The dressing must be acceptable to the patient. It must not impair movement and must not be a cause of shame.
- Cost effectiveness and affordability: the best dressing available is not necessarily the best for the patient. Always keep the financial restraints in mind and work within that limits. It is of no use telling the patient about this wonderful dressing, only to tell him / her that it is too expensive to use.¹
- Logistical factors: Use dressings with changing frequencies that are manageable by the carers. The dressings must also not be to complicated so that the carers could not effectively apply them.¹⁵

10. How would you predict healing?

A chronic wound being treated optimally should be 30% smaller by week 4 and 50% by week 6. The aim is closure at week 12. If not, other treatment regimen should be re-evaluated and if necessary, other advanced treatment modalities should be used.¹⁶ "The wound is looking better" is not an acceptable evaluation of a wounds progress.

Evaluation of wound healing is complex and difficult. The fact that wounds are irregular in shape and three-dimensional necessitates a

Table 5: Infection and Inflammation^{8, 9}

Definition ^{8, 9}	Clinical signs	Clinical action required
Contamination	This is the presence of non-replicating bacteria in a wound.	Cleansing and irrigation to remove visible contaminants No systemic antibiotic treatment
Colonization	This is the presence of replicating bacteria in a wound. All chronic wounds al colonised with organisms but it does not cause host damage.	Wounds heal normal with the bacterial colonisation present No treatment is necessary apart from the normal wound care plan.
Critical colonization/ Superficial infection (NERDS Criteria)	Here the equilibrium has being distorted between the negative effects of the bacteria and the healing capabilities of the wound	Healing is delayed or stalled but the classical signs of infection are not present. Topical antimicrobial dressings are indicated for treatment (Ag, Slow release iodine, NaCl, PHMB).
Systemic infection/ Deep infection (STONEES criteria)	The infection and tissue damaging effects spread deeper into the adjacent tissue and host response is activated	Wound deterioration present Systemic antibiotic treatment, either orally or intravenously indicated. Topical antimicrobial dressings (Ag, Slow release iodine, NaCl, PHMB).
Persistent inflammation	Inflammation is part of the normal healing cascade but if it gets out of hand and persists, it will cause the wound healing to stall and even to regress. Possible causes are: tissue ischemia, infection the presence of devitalised tissue causing an excess of MMP's ¹²	First remove or treat the cause. Then anti-inflammatory medication (systemic Doxycyclin) and/or dressings could be used. (Ibuprofen impregnated and some Ag^0 dressings). ¹⁰

skilful clinician to also use a scientifically developed tool to aid his/ her evaluation of the wounds size.¹⁷

The first step is determine what stage the wound is in and deepest wound will remain the stage of the pressure ulcer until healing has occurred. Staging of a pressure ulcer gives an idea of the depth of the ulcer.^{5,17} The size of the wound could be determined by actually measuring the maximum coronal length, then the maximum transverse width perpendicular with the coronal length*. Lastly determine the depth of the wound.

In using planimitery the wound edges can be traced manually on a piece of acetate grid. Include the undermining in the determination of the size of the ulcer.¹⁷ Computer programs and other smart phone apps are also available that could do this planimitery for you in a neat way.

Other aspects to be observed in evaluating the healing of the wound is the health of the surrounding tissue, the state of the wound bed and if wound edges is rounded or not.¹⁷

Recommendation 18

Agreement: 96%

Evaluation of the healing of a wound could be done in 3 stages:

- · Is the patient feeling better? (Clinical improvement)
- Does the wound bed look different than the previous visit? (Qualitative changes)
- Is the wound smaller? (Quantitative changes)

11. When and what kind of adjunctive or active therapies would you recommend when other factors have been corrected and healing does not progress?

Adjunctive therapy may only be considered if every step of the Wound Bed Preparation Paradigm have been followed and reevaluated.¹⁸ It must be established with certainty that the wound is healable because adjunctive therapy have no place in non-healable or maintenance wounds.¹⁰

The following proven modalities could be used in patients with healable but stalled pressure ulcers:⁵

- 1. Electrical stimulation therapy.
- 2. Platelet-derived growth factor.
- 3. Therapeutic ultrasound.
- 4. Larval debridement therapy.
- 5. Surgical intervention may be indicated for deep non healing pressure ulcers.

Recommendation 19

Agreement: 100%

Adjunctive therapies do not replace adherence to the wound bed preparation paradigm with first line actions to be infection control, debridement and moisture balance.

12. Which members of an interprofessional team could or should be part of the management of this condition for improving cost effective patient care outcomes with the cooperation of healthcare systems?

In such a multi-factorial disease as pressure ulcers it is obvious that the full scope of care cannot fall on the shoulders of one person. Each member of an inter-professional team involved in the treatment of the patient with a pressure ulcer adds expertise, fill knowledge gaps, broaden the perspectives and optimizes patient care delivery.¹⁹

The people making up the team consists of 3 groups: The patient, the family and the carers. Each team must be individualised according to patient specific needs. The members of the team also varies during the process of healing because not every member's expertise is needed all the time.¹⁹

The goal the inter-professional team must strive for:20

- P Professional expertise.
- E Evidence base medicine.
- A Approach wound care with a patient centred attitude.
- C Collaboration between all the team members.
- E Empathy towards the patient and their loved ones.

Recommendation 20

Agreement: 58.3% - 100%

Because an inter-professional team is a fluid structure, it might be a good idea to have a team co-ordinator:

- This person should stay the same throughout the treatment process.100%
- This member does not have to be a medically educated 60.8%
- Could be a significant family member 60.8%
- Co-ordinate all the members to pull in the same clinical direction 86.9%
- Will help in preventing duplication. 95.8%

CONCLUSION

Re-assessment in frequent intervals is important. If a wound does not progress according to the projected trajectory the underlying aetiology should be reassessed for:

- Status of the original disease (recurrence, deterioration, complication)
- · Infection with clinical and / or laboratory investigations
- · Elevated matrix metalloprotease activity
- · Aggravating factors: anaemia, diabetes, poor nutrition
- Debridement of devitalised tissue if the arterial supply is adequate
- Malignancy (Rolled wound edges and nodular appearance of wound bed)

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REC 7

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Addendum 1 - Braden Scale for pressure ulcer risk assessment

BRADEN SCALE – For Predicting Pressure Sore Risk

SEVERE RISK : Total score ≤ 9 HIGH RISK : Total score 10-12 DATE OF											
МО	MODERATE RISK: Total score 13-14 MILD RISK: Total score 15-18 ASSESS Image: Comparison of the score 15-18										
RISK FACTOR	SCORE/DESCRIPTION						1	2	3	4	
SENSORY PERCEPTION Ability to respond meaningfully to pressure-related discomfort	1. COMPLE LIMITED – L (does not mc grasp) to pain due to dimin consciousnes sedation, C limited ability over most of surface.	TELY Jnresponsive pan, flinch, or nful stimuli, ished level of is or DR y to feel pain body	2. VERY LIMITED – Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness, OR has a sensory impairment which limits the ability to feel pain or discomfort over ½ of body.	3. SLIGHTLY LIMITED – Responds to verbal commands but cannot always communicate discomfort or need to be turned, 4. NO II Respond comman sensory would lin or voice discomfor 0R has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 4. NO II		4. NO IMPAIRMENT – Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort.					
MOISTURF	1 CONSTAN	NTLY	2 OFTEN MOIST – Skin	extremities.	Y	4 RAR	FLY MOIST - Skin				
Degree to which skin is exposed to moisture	MOIST – Skin moist almost by perspiration etc. Dampne every time par moved or tur	n is kept constantly on, urine, ss is detected atient is rned.	is often but not always moist. Linen must be changed at least once a shift.	MOIST – Skin is occasionally moist, requiring an extra linen change approximately once a day.		y dry; linen only changing at intervals.					
ACTIVITY Degree of physical activity	1. BEDFAST to bed.	– Confined	 CHAIRFAST – Ability to walk severely limited or nonexistent. Cannot bear own weight and/or must be assisted into chair or wheelchair. 	3. WALKS OCCASIONALLY – Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in		KS ENTLY– Walks the room at least day and inside least once every during waking					
MOBILITY Ability to change and control body position	1. COMPLE IMMOBILE make even sl in body or ex position with assistance.	TELY – Does not light changes tremity lout	2. VERY LIMITED – Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.	bed or chair. 3. SLIGHTLY LIMITED – Makes frequent though slight changes in body or extremity position independently. 4. NO L Makes n frequen position assistan		IMITATIONS – major and t changes in without ce.					
NUTRITION Usual food intake pattern ¹ NPO: Nothing by mouth. ² IV: Intravenously. ³ TPN: Total parenteral nutrition.	1. VERY PO eats a compl- Rarely eats m of any food c 2 servings or products) pe fluids poorly. take a liquid supplement, c is NPO ¹ and/ maintained c liquids or IV ²	OR - Never ete meal. hore than 1/3 offered. Eats less of t or dairy r day. Takes Does not dietary OR or for more	2. PROBABLY INADEQUATE – Rarely eats a complete meal and generally eats only about ½ of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement OR receives less than optimum amount of liquid diet or tube feeding	3. ADEQUATE – Eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products) each day. Occasionally refuses a meal, but will usually take a supplement if offered, OR is on a tube feeding or TPN3 regimen, which probably meets most of nutritional needs.		EXCELLENT – Eats lost of every meal. ever refuses a meal. sually eats a total of 4 or lore servings of meat ad dairy products. ccasionally eats etween meals. Does not equire supplementation.					
FRICTION AND SHEAR	1. PROBLEN moderate to assistance in Complete lift silding agains impossible. F slides down i chair, requiri repositioning maximum as Spasticity, co or agitation l almost const	A-Requires maximum moving. ing without is sheets is requently n bed or ng frequent with sistance. mtractures, eads to ant friction.	2. POTENTIAL PROBLEM- Moves feebly or requires minimum assistance. During a move, skin probably slides to some extent against sheets, chair, restraints, or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.	3. NO APPARENT PROBLEM – Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair at all times.							
TOTAL Total score of 12 or less represents HIGH RISK											
ASSESS DATE EVALUATOR SIGNATURE/TITLE ASSESS. DATE EVALUATOR					I SIGNA		TITLE				
1 /	/		•	3	/ /	/					
2 /	/			4	/ /	/					
NAME-Last	Firs	st	Middle	Attending Physi	ician	Recor	d No.	Room	n/Bed		
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