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ENHANCING NURSING TRAINING AND PROTOCOLS FOR EFFECTIVE WOUND CARE IN PRIMARY HEALTHCARE SETTINGS

Jehanzeb Khan[1*], Shafie Muse Tahir[2], Mbony Joshua C[3], Dr. Rabbyya Kausar[4], Syed Muhammad Abbass[5], Nosheen Akhtar[6]

[1*]Nursing Instructor, College of Nursing, Pakistan Institute of Medical Sciences, G-8/3 Islamabad, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad, Pakistan,
Email: jehanzebkhanpims@gmail.com
[2]MBBS IUA Medical Doctor, Khartoum Dermatology & Cosmetology Center – Hargeisa, Somaliland, Email: aymanshafi062@gmail.com
[3]State Employed, Medical Doctor, General Medicine, Santa District Hospital, Cameroon,
Email: mbonyjosh92@yahoo.com
[4]Lecturer, University Institute of Physical Therapy, University of Lahore Sargodha Campus,
Email: rabbyya.kausar@uipt.uol.edu.pk
[5]House officer, Gastroenterology, Bakhtawar Amin Medical College, Multan, Pakistan
Email: smuhammadabbasz22@gmail.com
[6]College of nursing, Niazi medical and dental college Sargodha, Pakistan

***Corresponding author:** Jehanzeb Khan
*Nursing Instructor, College of Nursing, Pakistan Institute of Medical Sciences, G-8/3 Islamabad, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad, Pakistan,
Email: jehanzebkhanpims@gmail.com

ABSTRACT:

Introduction: Chronic wound treatment poses a significant challenge, consuming substantial time and resources for medical and nursing staff. A multitude of materials are available for assistance, necessitating a careful selection process to optimize efficacy and streamline treatments. The cornerstone of this selection process is a comprehensive assessment of both the patient's overall condition and the specific wound characteristics.

Background: The market offers a diverse array of materials designed to aid in chronic wound care. However, the efficacy of these materials is contingent upon the judicious selection guided by a thorough understanding of the patient's health status and the unique attributes of the wound. This underscores the importance of a systematic approach to material selection.

Objective: The primary objective of this bulletin is to provide guidance to healthcare professionals in the strategic selection of materials for chronic wound care. By offering insights into the importance of patient and wound assessment, this bulletin aims to enhance the overall effectiveness of treatment strategies.

Methods: The bulletin emphasizes a methodical approach, encouraging healthcare practitioners to invest time in a comprehensive assessment of both the patient and the wound. By synthesizing

information from these assessments, practitioners can make informed decisions in selecting materials for chronic wound care.

Results: The outcomes of a meticulous patient and wound assessment serve as the foundation for optimal material selection. By employing this approach, healthcare professionals can enhance the efficiency of treatments and, consequently, contribute to improved patient outcomes.

Discussion: The discussion section delves into the significance of strategic material selection in chronic wound care. It highlights the impact of an informed decision-making process on treatment efficacy, emphasizing the importance of a holistic approach in caring for chronic wounds.

Conclusion: In conclusion, this bulletin serves as a valuable resource for medical and nursing staff engaged in chronic wound care. By advocating for a methodical approach to material selection based on thorough patient and wound assessments, it aims to empower healthcare professionals to optimize treatment outcomes and resource utilization

Keywords: Wound Healing, Chronic Wounds, Ideal Healing, Traditional Healing, Moist Healing

INTRODUCTION:

The management of chronic wounds is a multifaceted process, with the patient unquestionably serving as its central component. To choose the appropriate, useful, and efficient material, all available resources must be focused on. An ill patient with an ulcer worsens the prognosis of the underlying pathology, reduces autonomy, lowers quality of life, raises morbidity and mortality, and uses more medical resources overall (Cereda, Veronese, & Caccialanza, 2024).

These injuries must be prevented, which is why it is crucial to always implement preventive measures (risk assessment, preventive skin care, etc.). These are not the subject of this bulletin, but they are nevertheless important to implement because they would help to prevent over 98% of pressure ulcers (PU). They should be used with all patients who are at risk because they are mentioned in a lot of publications (Zhou et al., 2024).

Selecting the best healing material is a difficult task. The patient's peculiarities are diverse, the therapeutic offer is extensive, and not all products are financially feasible (keep in mind that a patient heals themselves, not a wound). Furthermore, since these treatments come at a high cost to the healthcare system, the effectiveness of the dressing must be considered when selecting one. Considering the population's increasing aging, this expense will undoubtedly rise in the upcoming years (Moreira et al., 2024).

The National Group for the Study and Consultancy on Pressure Ulcers and Chronic Wounds (GNEAUPP) conducted the 4th National Prevalence Study3 in 2013, which revealed that the prevalence of pressure ulcers in adults in hospitals is 7.87% in social health centres, 13.41% (double that of the previous study), 0.44% in primary care for patients over 65, and 8.51% for those in-home care programs. This study also shows that nearly two-thirds of all pressure ulcers (PUs) originate from nosocomial settings, such as hospitals or social health centres. This finding may serve as a reminder to take all reasonable precautions to prevent PUs. The fifth study is in progress right now (Gültekin et al., 2024).

PHASES OF WOUND TREATMENT:

Regardless of the cause, healing a chronic wound necessitates following specific guidelines to speed up the healing process:

1. **Complete assessment of the patient:** including physical examination, clinical history, nutritional and psychological evaluation, and setting of care...
2. **Assessment of the lesion:** cause, site, stage, dimensions, tissue type, tunnelling, perilesional skin, discharge, discomfort...
3. **Relieving pressure on tissues**: by working on support surfaces.

4. **General patient care**: including emotional, nutritional, and preventative measures.
5. **Ulcer care:** preparing the wound bed, applying dressings, preventing infections...
6. **Regular evaluation of injuries.**

Furthermore, it is crucial to implement an educational program for patients, families, and caregivers (Wang, Li, & Zhao, 2024).

TYPES OF TREATMENT:

There are two treatment modalities, and Table 1 lists their attributes:

- **Dry healing (Traditional):** using textile dressings (gauze), debridants, and antiseptics.
- **Heals in a moist environment:** using various dressings to keep the wound's humidity at a suitable level (He, Cen, & Tian, 2024).

DRY HEALING	HEALING IN MOIST ENVIRONMENT
Does not preserve moisture in the wound, and delays healing.	Promotes cell migration during healing.
The temperature in the wound bed decreases, and healthy cells die.	Facilitates gas exchange.
The scab formed and the material used adheres to the wound bed.	Allows exudate to be managed.
Does not isolate external contaminants.	Does not damage the cells formed when removing the dressing.
	Shortens healing time.

Table 1. *Characteristics of the different types of care.*

WOUND BED ASSESSMENT:

TIME SCHEME:

Every time a wound is treated, as well as at every stage of wound healing, an evaluation of the wound bed needs to be done. It is a type of all-encompassing wound care that promotes endogenous healing and increases the potency of additional therapeutic interventions. It is a dynamic idea that has to be modified to meet the demands of the wound and the healing procedure (Y. Liu et al., 2024).

A number of tools are available for evaluating wounds, the most popular and widely used being TIME, DOMINATE, and RESVECH 2.0. The European Wound Management Association (EWMA) defines it as a dynamic wound bed preparation scheme. There are four stages to its development:

T Tissue: non-viable tissue control.

I (Infection): Inflammation and infection management.

M: Humidity: control of exudate.

E (Edge): epithelial edges are stimulated (Nangare et al., 2024). It is represented flow diagram in Figure 1.

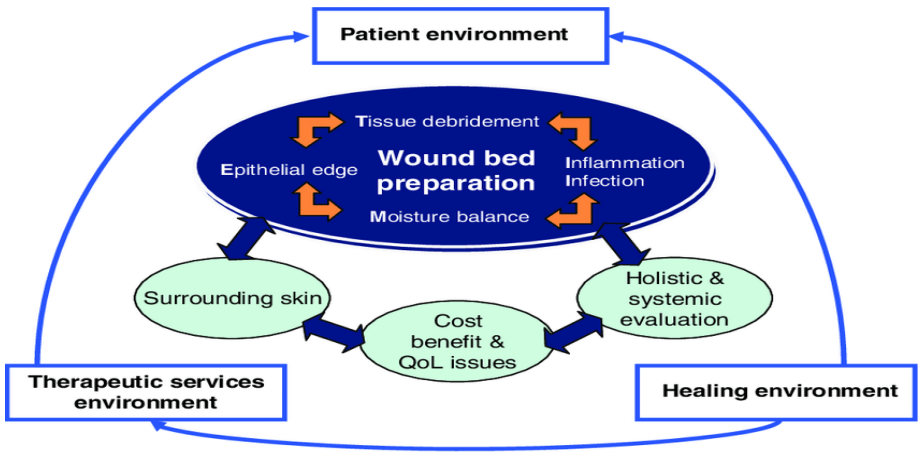

Figure 1. *Flow diagram of the TIME scheme*

T: NON-LIVING TISSUE CONTROL:

Non-viable or devitalized tissue presents an ideal environment for infection and acts as a physical barrier to healing. This tissue may exhibit either wet necrotic (fibrin or slough) or dry necrotic (eschar). The seven most common forms of debridement used for removal are:

- **Surgical:** extensive resections that may result in bleeding and entail the removal of some healthy tissue in addition to necrotic tissue. It is not very selective and is indicated in devitalized tissues of deep, extensive, and very exudative lesions; it is also indicated in thick, very adherent eschars. needs an operating room, as well as sedation or anaesthesia (Mandakhbayar et al., 2024).

- **Cutting:** Breastfeeding several times to remove devitalized tissue until a viable tissue level is reached. Asepsis and sterile tools are necessary. Starting with the weakest region, we release one of the edges so that we can keep removing non-essential tissue until we get to a healthy region. shown in necrotic, hyperkeratotic tissues, either with or without exudate, and whether or not there are infection-related symptoms. It is a painful procedure that is more selective than surgery, but it carries a risk of bleeding (caution in anticoagulated patients).

Not recommended in non-healing ulcers (because of inadequate vascular supply or type of lesion) or desquamated tissues (because tearing the tissue can harm the surrounding healthy tissue)(Nandhini, Karthikeyan, & Rajeshkumar, 2024).

- **Enzymatic:** the most prevalent type, it works by rupturing collagen bridges to break down necrotic tissue. Examples of these enzymes are collagenase and streptokinase. Compared to autolytic, it is more convenient, quicker, and selective.
- **Autolytic:** caused by endogenous enzymes acting on devitalized tissues, fibrinolysis, and hydration of the ulcer bed. Even though it moves slowly, it is the most painless, selective, and atraumatic. The material is hydrogel.
- **Mechanical**: techniques include hydromassage baths, continuous pressure irrigation, mechanical abrasion with dressings, and rubbing of the ulcer bed. It's an injurious and indiscriminate approach. Table 2. Features of the various techniques for debridement (Ye et al., 2024).
  To boost the debridement effect, some of them can be combined, such as cutting + enzymatic, autolytic + enzymatic, and cutting + autolytic. Other less common debridement techniques include biological or larval, which uses sterile Lucilia sericata larvae, and osmotic, which involves exchanging fluids of different densities by applying hyperosmolar solutions. The latter is recommended for cavitated ulcers with a lot of necrotic tissue and copious exudate that are challenging to access for other procedures (Dong et al., 2024).

Debridement Type	Action speed	Tissue selectivity	Pain	Exudate	Wound Infection	Cost
Surgical	1	2	4	1	1	4
Autolytic	4	3	1	3	4	1
Mechanic	3	4	3	2	2	3
Cutting	2	2	3	2	2	1
Enzymatic	2	1	2	4	3	2

Table 2 *Summarizes The Characteristics Of The Main Debridement Methods: From 1: Most Favorable To 4: Least Favorable.*

The best debridement technique will be chosen based on the patient, wound bed, and clinical circumstances.

As a general rule:

- We will use surgical or sharp debridement when there are indications of infection on dry necrotic tissue. In order to promote hydration and partial debridement with sharps, we will apply autolytic/enzymatic debridement in conjunction with occlusive or semi-occlusive healing

dressings in a moist environment if there are no signs of infection. The lower extremities with dry necrotic plaques and ischemia would be an exception to the rule, meaning that this kind of debridement would not be appropriate in those cases (P. Singh et al., 2024).

- It is recommended to use healing dressings in a moist environment along with autolytic and/or enzymatic treatment if there is moist necrotic tissue present. Remember that in order to prevent maceration and excoriation, the peri-wound skin needs to be protected by adding more moisture to the wound bed (Fani et al., 2024).

I: INFECTION/INFLAMMATION CONTROL:

When there is a wound, the skin's barrier function is compromised, allowing germs to enter.

- **Contamination:** There are no growth or clinical issues brought on by bacteria.
- **Colonization:** the bacteria grow and do not harm the tissues surrounding the wound. Until now, intervention is not required only wound monitoring.
- **Critical Colonization:** A biofilm, which is a population of bacteria and occasionally fungi bound together by a protective polysaccharide matrix, typically forms during critical colonization. Even when there are no obvious symptoms of inflammation, the bacteria still cause delayed or interrupted healing. Locally, it manifests as a slight increase in exudate, delayed healing, and mild pain. Here, an antiseptic could be used (as a solution, cream, dressing, ointment, etc.) while taking into account the degree of cytotoxicity, resistance potential, and allergies. Always assess the indication for each type of wound separately, considering the advantages and disadvantages of applying an antiseptic (refer to technical data sheets, laws, usage instructions, etc.) (S. Liu et al., 2024).
- **Infection:** An infection results in the growth of bacteria, halted healing, and tissue damage. The typical symptoms include redness, fever, pain, bad odour, cellulitis, and purulent exudate. In this instance, we'll employ the same procedures as before along with the suitable antibiotic after conducting a culture. Start it if you have to.

  Use a broad-spectrum one until the culture results are obtained before obtaining the results. Dressings containing silver, in various forms (elemental silver, inorganic compound, organic complex), and on various supports (gauze, hydrocolloid, hydrofibre, alginate...), can be applied to an ulcer exhibiting symptoms of infection (Singh, Yadav, Rehman, & Solanki, 2024).

  The purpose of the two-week "test" is to confirm whether this treatment is effective. Apply the silver antimicrobial dressing for a fortnight, and then evaluate once more. If, after two weeks:
- An improvement is observed, the infection's symptoms vanish, the dressing is taken off, and further healing dressings are applied in a humid atmosphere.
- There has been a slight improvement, but the infection signs have not vanished. Hence, silver dressings should be used along with sporadic checks, like every two weeks.
- If there is no improvement, take off the silver dressing and think about combining a systemic antibiotic with another antimicrobial therapy.

  As with any antimicrobial, prolonged and needless use of silver dressings should be avoided. Applying a non-antimicrobial dressing should be taken into consideration after the wound has healed and the microbial load has been reduced (Pallikkunnel, Joseph, Haponiuk, & Thomas, 2024).

When not to use dressings made of silver:

- When there are no symptoms of infection.
- Low-risk surgical wounds that are clean.
- Chronic wounds heal according to plan.
- Tiny, acute wounds that pose little chance of infection.
- Individuals who are silver sensitive.
- Pregnancy as well as nursing.
- When the manufacturer advises against it.

M: EXUDATE MANAGEMENT:

Controlling the amount of wound exudate and keeping the bed moist is essential for maintaining healing in a moist environment without causing maceration of the edges(Tabriz & Douroumis, 2024).

- Hydrogel dressings, impregnated dressings (fat tulle), and silicone mesh are the best options if the **wound exudes little to no fluid**. Its function is to hydrate the injured area.
- Polyurethane foams, hydrocolloid hydrofibres, and dressings will be used if the **exudate is medium.**
- Polyurethane and alginate foam dressings, which have a higher absorption capacity, will be used if the **exudate is abundant**.

A number of dressings are frequently required in combination, with one serving as the primary dressing and the other as a secondary dressing for fixation and protection. When employing an alginate, for instance In order to keep curing in a moist environment like a polyurethane foam or film an additional dressing is typically required. A combination of wet and dry cure dressings is occasionally observed. This doesn't follow its indication, so it should be avoided. For instance, using foam as a secondary dressing and wire gauze as a primary dressing would not be advised (Parimi, 2024).

E: STIMULATION OF EPITHELIAL BORDERS:

In order for healing to take place, the skin surrounding the wound must remain intact and the wound's edges must never contain any devitalized tissue. In neuropathic ulcers, for instance, this is accomplished by eliminating corns and calluses; in moisture-related skin lesions, such as those near the genitourinary system, the anus, stomata, etc., it is accomplished by managing bodily fluids (urine, faeces, saliva, etc.) (Sharma, Shambhwani, Pandey, Pandey, & Kumar, 2024).

It is necessary to take actions that promote the development of granulation tissue and the epithelialization of the margins, such as managing and avoiding macerations and abrasions brought on by high humidity levels or frequent trauma. Hyperoxygenated fatty acids (HAHO), collagen powder, and barrier creams or films (zinc oxide) can all be used to achieve this. Numerous products are available for the care of the skin around wounds, but it is important to consider the uses and limitations of each. Because zinc oxide pastes have an oily substance, they should be removed carefully because they can cause skin irritation from prolonged exposure and obscure the skin around wounds (Kaur & Purwar, 2024).

CHARACTERISTICS OF THE IDEAL CONDITION:

The qualities that a healing dressing in a moist environment ought to possess are enumerated in Table 3. Gauze or dry dressings don't fulfil the majority of these criteria (Singh, Dabas, Rehman, & Solanki, 2024).

CHARACTERISTICS OF AN IDEAL DRESSING
Be biocompatible
Protect the wound from external physical, chemical and bacterial attacks.
Keep the ulcer bed continually moist and the surrounding skin dry.
Maintain body temperature.
Eliminate and control exudates and non-viable tissue through absorption.
Leave the minimum amount of waste in the wound.
Adapt to difficult locations.
Be easy to apply and remove.
Reduce pain.

Table 3. *Characteristics of an ideal dressing for polymerization in a moist environment*

PRIOR TO SELECTING A CONDITION:

Table 4. Summarize the points to consider before choosing a dressing (Hashimoto, Nagoshi, Nakamura, & Okano, 2024):

BEFORE CHOOSING A DRESSING
Location of the wound
Size
Stadium
Amount of exudate
Cavitation
Periulceral skin condition
Signs of infection
General condition of the patient
Level of care and availability of resources
Cost-effectiveness
Ease of application in the context of self-care

Table 4. *Considerations before choosing a dressing.*

Prior to applying a dressing, the wound must also be cleaned. To facilitate dragging while preventing damage to healthy tissues, a physiological solution, sterile water, or even drinking water will be used (20 ml syringe, with 30G needle). Avoid using anionic surfactants (found in detergents, shampoos, soaps, etc.) as they may interfere with the proteolytic enzymes or antiseptics used in debridement (Zhang et al., 2024).

DRESSINGS USED DEPENDING TO THE TYPE OF ULCER:

As previously stated, a thorough evaluation of the wound is necessary to ensure a successful outcome, and the aetiology should be taken into consideration when selecting a healing material. The type of treatment used is irrelevant if the lesion does not resolve and its origin is overlooked. For instance, a venous aetiology vascular ulcer will seldom heal itself again if the venous return issue is not fixed (Verma, Yadav, & Solanki, 2024).

1. PRESSURE ULCER:

They typically appear in the areas of maximum friction the sacrum, heels, trochanters, ischia, malleoli, etc. in bedridden or immobile patients. Four stages are possible for them:

Stage I: involvement of the epidermis, persisting redness or pallor after release of pressure.

Stage II: superficial, involving partial skin loss affecting the dermis, epidermis, or both, and the appearance of abrasions, vesicles, or craters.

Stage III: Loss of full-thickness skin.

Stage IV: complete loss of skin thickness combined with other tissues being destroyed or necrotized.

Depending on the ulcer's stage, amount of exudate, presence or absence of infection, and cavitations, different treatments will be administered (H. Li et al., 2024) (Table 3).

STAGE I	STAGES II TO IV
AGHO	Debridement if necessary
Special pressure management surfaces (anti-decubitus mattress)	Treatment of the infection, if any (antimicrobial dressings or systemic treatment), choose the appropriate dressing according to the amount of exudate.
Devices for specific areas (anti-decubitus socks)	If there is a bad odour, activated charcoal dressings
	If there is no exudate, we will hydrate the wound with hydrogel

Dressings: extra-fine hydrocolloids to avoid friction and foams or hydropolymers as heel pads.	If there is a lot of exudate, use absorption, with alginates, hydrocolloid hydrofiber, foams
	For the edges, moisturize if they are dry, and if they are macerated, barrier ointments or non-irritating skin protectors.

Table.5 *Stage-by-stage treatment*

2. DIABETIC FOOT ULCER:

Three different kinds of diabetic foot ulcers exist:

- **Neuropathic:** mild exudate in areas of mechanical stress and friction, loss of sensation, local pulse, and perilesional callus.
- **Ischemic:** excruciating, with minimal exudate and diminished peripheral pulses at the extremities.
- **Neuroischemic:** the most common, which they both have prior signs and symptoms. Debridement in these situations needs to be done very carefully to prevent damaging important tissues (X. Li et al., 2024).

When considering this kind of ulcer, three essential factors need to be considered:

- Pressure control involves relieving pressure, redistributing weight, and/or scraping off calluses.
- Reestablishment or sustenance of throbbing blood flow.
- Control of metabolism.

In this situation, debridement plays a critical role, and the best course of action is sharp debridement, particularly in areas with callus accumulation, scarification, fibrous tissue, or visible non-viable tissue. Typically, deeper ulcers involving the tendon or joint capsule are treated with dressings. As a result, the previously mentioned preventive debridement will always be required (de Sousa Afonso et al., 2024).

The same protocol that applies to pressure ulcers will be followed in the event of an infection: cleaning, antimicrobials, or systemic antibiotics in the case of cellulitis, lymphangitis, or osteomyelitis. Hydrogel should be used if the ulcer is not exuding; if it is, alginate, hydrofibre, or foam should be used. Regarding the edges, we advise using non-irritating skin protectors if they are macerated and AGHO if they are dry. A deep abscess or ulcer affecting the bone will necessitate hospitalization for parenteral antibiotic therapy, vascular assessment, and debridement (Gefen et al., 2024).

3. VASCULAR ULCER:

	VENOUS	**ARTERIAL**
Location	The middle paramalleolar zone, or internal supra-malleolar zone, sometimes surrounds the entire leg.	Plantar area, external edge of the foot, interdigital spaces, heel and toes, external lateral aspect of the knee.
Size And Shape	Variable size, they can be single or multiple, rounded or irregular, superficial.	Small, rounded, superficial, with necrotic plaque or crust.
Edges	Soft, purplish red, as they become chronic, paler and harder.	Smooth, rounded and hyperemic
Perilesional Skin	Stasis eczema, ocher dermatitis, white atrophy, hyperpigmentation.	Pale, shiny, thin
Pain	Painless, becomes painful if there is an infection	Deep and intense, disabling
Pulses	Presents	Missing
Background	Depending on the condition, it varies from red to yellow if there is slough or necrosis.	Necrotic, greyish, pale and with slough.
Exudate	Yes	No, except infection.
Aetiology	Ambulatory venous hypertension secondary to slowed venous and capillary flow	Ischemic, atheroembolic

Infection	Possible	Possible
EDEMA	Distal located, improves with rest and cold	There may be, due to the declining position to reduce pain.
TREATMENT	Constant and gradual multilayer compression, non-adherent dressings, assess debridement, exudate, infection and perilesional skin	Non-compressive dressing, non-adherent dressings, generally do not debride, assess for infection and perilesional skin, control pain

Table. 6 *Summarizes the main characteristics*

AN IMPORTANT NOTE: THE REGULARITY OF DRESS CHANGES:

As was already mentioned, the objective of moist wound healing is to keep the wound at the optimal temperature and humidity level to promote the growth of new tissue. Thus, it is best to minimize the disruption of these conditions. Changing or removing the dressing and briefly exposing the wound to air usually results in a drop in wound temperature (between 5 and 10ºC), which causes a relatively prolonged decrease in wound temperature. It also causes fluid to be lost through evaporation. Leukocyte and mitotic activity, as well as the neoepithelium's and granulation tissue's removal of the new vessel ("12. Retinopathy, Neuropathy, and Foot Care: Standards of Care in Diabetes—2024," 2024).

Furthermore, there's a chance that some of the newly grown tissue will be removed along with it, which would cause a major healing delay. This is the rationale behind the recommendation to minimize dressing changes a principle to remember each time you administer treatment in a humid setting (Ndlovu, Alven, Hlalisa, & Aderibigbe, 2024).

The majority of dressings on the market list a maximum stay duration of three to ten (or even fourteen) days (silicone sheets). According to each product's characteristics, it would be wise to try to maximize its use and, if it is not degraded or saturated, to leave it in place, adhering to the manufacturer's recommendations for the maximum retention period (Chen et al., 2024).

When should I use other products?

ANTISEPTICS:

As previously observed, traditional treatment would not be recommended for chronic wounds unless one of the following situations existed:

- Non-revascularized ischemic lesions, where the goal is not healing but preventing infections.
- A damaged area containing devitalized tissue will be carefully removed.
- For resection (major or minor amputation), to define the necrosis.
- Additional applications include biopsies or percutaneous aspirations (invasive diagnostic tests) prior to and following debridement with sharp instruments; and infected wounds, always in conjunction with systemic therapy (Chen et al., 2024).

Antiseptics are frequently used to wash and clean chronic wounds without any reason, despite the fact that there are very few situations in which they are appropriate. This practice ought to end since it has been demonstrated that:

- Antiseptics are cytotoxic to newly formed tissue and lack selectivity, which slows the healing process.
- They might hinder the effectiveness of other topical treatments (collagenase and povidone are incompatible).
- They are not immune to the issue of bacterial resistance, particularly when their moment of activation and residual effect which indicates when a treatment needs to be renewed are not taken into consideration.
- The body's absorption of it could result in systemic issues if it is used continuously (Mukhopadhyay, To, Liu, Bai, & Leung, 2024).

The most popular broad-spectrum antiseptics' primary attributes are:

- **Alcohol 70º:** irritating and prone to forming clots that shield bacteria that survive, avoid using it on eroded skin.
- **Chlorhexidine (0.05–2%):** The half-life of chlorhexidine (0.05–2%) is 6 hours, with an onset period of 15–30 seconds. Valid only on intact, healthy skin.
- **10% povidone-iodine solution:** this solution has a 3-minute onset period and a 3-hour residual effect. Delays the granulation tissue's growth and raises the issue of potential systemic absorption. Collagenases and other proteolytic enzymes are incompatible with it. Use it on skin that is healthy and unbroken.
- **1.5–3% hydrogen peroxide:** this solution acts instantly, leaves no residue, and carries the risk of causing tissue damage and gas embolism when applied to ulcers that have been cavitated (Bebiano, Lourenço, Granja, & Pereira, 2024; Xiang et al., 2024).

Organic materials generally reduce the effectiveness of antiseptics, so as previously mentioned; we must wash the wound before applying them.

TOPICAL ANTIBIOTICS:

Because of the possibility of bacterial resistance and toxicity from systemic absorption, their use is generally not advised. There have been reports of neomycin and bacitracin-induced ototoxicity and nephrotoxicity. Several antiseptics and antibiotics are evaluated for their efficacy in treating pressure ulcers in a Cochrane review. These are brief, diverse, small-scale studies that don't consistently show that these products are helpful for this kind of wound (Bebiano et al., 2024).

There have been reports of neomycin and bacitracin-induced ototoxicity and nephrotoxicity. Furthermore, products with lanolin as an excipient have the potential to sensitize and trigger an inflammatory response. When anaerobes, which cause bad odour, are present in infected ulcers, metronidazole is frequently used in irrigation. As Table 5 illustrates, there are no topical formulations for this indication available in Spain. The few studies that have been conducted, the majority of which focus on tumour ulcers, also provide little scientific evidence (Ma et al., 2024).

The recommendations found in the pertinent Technical Data Sheets must be considered whenever these medications are used. The key features of topical antibiotics that are commonly applied to wounds are compiled in Table 5 (Kar et al., 2024).

ANTIBIOTIC	INDICATION	DOSAGE	CONTRAINDICATIONS
ARGENTIC SULFADIAZINE	Second and third-degree burns, varicose and pressure ulcers.	1-2 times a day in slightly infected wounds or every 4-6	Incompatible with collagenase (wash very well before applying it). Renal or liver failure is, a risk of drug accumulation, so its use is contraindicated in these patients. The treated areas should not be exposed to light, due to possible skin discoloration.
FUSIDIC ACID	Impetigo and impetiginized dermatosis	hours in very infected wounds	Possible resistance of Staphylococcus Aureus
METRONIDAZOLE	Inflammatory papules, pustules and erythema of acne rosacea.	2-3 times a day	Potentiates the anticoagulant effect of coumarin and warfarin.
MUPIROCIN	Primary infections, such as impetigo, folliculitis and furunculosis. Secondary infections, such as atopic dermatitis, eczematous dermatitis superinfected contact dermatitis and infected traumatic lesions, provided their extension is limited.	2 times a day	It should not be used in lesions where absorption of large amounts of polyethylene glycol is possible, especially if there is evidence of moderate or severe renal failure.

NEOMICIN + CENTELLA ASIATICA EXTO	Wound healing. Ulcers, sores, bedsores and other skin lesions. Some types of burns. Eczema and intertrigo.	2-3 times a day	Hypersensitivity
NITROFURAL	Second and third-degree burns. Skin infections. Preparation of surfaces in skin grafts	1-3 times a day	Caution in kidney failure may cause symptoms of progressive kidney deterioration

Table. 7 *Main topical antibiotics used in wounds.*

COMMON MISTAKES MADE WHEN USING ANTISEPTICS AND ANTIBIOTICS:

- Treat infected wounds with antiseptics; other wounds need to be treated differently.
- Inappropriate dosages.
- Use them "just in case" on clean wounds.
- Persistent use. Periodically assessing the treatment's efficacy is necessary.
- Before enzymatic debridement, treat with povidone-iodine (which becomes inactivated) or dress with silver dressings (which can also precipitate and become inactivated).
- The features of the primary dressing types are enumerated in the attached attachment. Do not consider the storage conditions of the container (exceed the maximum storage time once opened, do not keep it closed when not in use, etc.) (Golebiowska, Intravaia, Sathe, Kumbar, & Nukavarapu, 2024).

FINAL CONSIDERATION:

When it comes to chronic wounds, healing in a moist environment has more advantages than traditional healing (dry healing) because, although it is more expensive, it also requires fewer healings when done correctly, which shortens healing times.

The efficacy of this kind of treatment is maximized through the prudent use of these resources. In order to accomplish this, careful product selection, patient-specific adaptation, and wound bed preparation are required. Respecting the manufacturer's instructions for use, the frequency of updates, and above all the main Clinical Guides' and published consensus documents' recommendations is also crucial.

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