ALZHEIMER'S QUEENSLAND

WOUND MANAGEMENT WORKBOOK Version 1

Name……..

Date Workbook commenced……

Date Workbook completed……..

Caveat

The workbook should not be used as a standalone resource. In a clinical situation, information and support must also be sought from the Policy intranet site at Alzheimer's Australia Qld

Statement of Indemnity

All Wrapped Up Nursing does not accept any responsibility for the use of this material outside of the scope for which it has been designed and outlined in the appropriate curriculum document.

Version Control

This is Version 1 of the Alzheimer's Qld wound management workbook and will remain current until 2025.

Overview of the Workbook

The aim of this workbook is to enhance your knowledge and understanding of skin integrity and wound healing. ENs/RNs need to be familiar with the basic structure and function of normal skin and be able to access medical or surgical text or wound care textbook to review these concepts to assist in completing this module.

Wound management is complex and utilises a holistic approach to address the needs of the person with a wound.

In this workbook, you will be exploring the guiding principles, which direct contemporary skin integrity and wound care practice and develop the skills to effectively manage wounds.

This workbook is to support your learning around maintaining skin integrity and wound healing in older people. It is a resource where you and your line manager/mentor can assess your current level of knowledge of skin and wound healing and create a learning plan. There are learning activities within the workbook where you can reflect on current practice and consider the information within the workbook on how to improve your practice. These reflective activities are for your own record and will not be assessed.
On completion of the workbook there are a mix of multiple choice and short answer questions to be completed to evidence achievement of the learning outcomes.

Key Concepts

- Skin and its function and how it changes with ageing.
- The normal wound healing process
- Factors that affect wound healing
- Cleansing agents and their actions
- Common chronic wounds and their management

Scope of Practice

Registered and Enrolled Nurses

Workbook Hours of Learning

Approximately 8 hours of CPD learning

Workbook Author

Kerrie Coleman NP All Wrapped Up Nursing

Contents

1. Skin Changes in the older person

The skin is the largest organ in the body. The average adult's skin covers an area almost equivalent to two square meters, accounts for 15 percent of body weight and receives one third of the body's circulating blood volume [3]. The average pH of the skin is 5.5 and can be described as the body's mirror as it reflects the person's physical and psychological health, age, ethnic background, and cultural differences [3]. Skin has 3 main layers, the top layer is known as the epidermis, the next layer the dermis and below the dermis is the subcutaneous fat (fatty layer) also known as the hypodermis)

The epidermis

Or the outer layer contains no blood vessels and is divided into 5 layers. Cells move from the base of the epidermis up to the surface, changing shape and structure as they go [1,2]. The outer layer of the epidermis plays a role in the skin's protective function. **The epidermis gets thinner as we age.**

The dermis

The main function of the dermis is to **provide physical support and nutrients** to the epidermis. Key substances found in the dermis include **collagen** and **elastin**. Collagen gives support and protection within the skin and this decreases as we age. It also contains nerve endings, sweat glands, hair follicles, sebaceous glands, and blood vessels. The papillary dermis contains smaller blood vessels which supply oxygen, elastic fibres, and nutrients to the lower epidermis. These vessels also assist in the removal of waste products from the skin into the general circulation[1,2] As we age, the skin becomes less elastic, due to the decrease in collagen, gravity takes over resulting in sagging skin, not returning to its original shape [2]. This makes the skin vulnerable to tearing or shearing [2].

The subcutaneous layer

This layer provides support for the dermis and consists largely of fat and connective tissue. The purpose of this layer is to protect the internal structures and provide insulation[1,2]. As we age this layer becomes thinner [1,2]. Older people's skin may also bruise more easily and be susceptible to traumatic wounds such as skin tears (see section 7), as the support structure deteriorates [1,2].

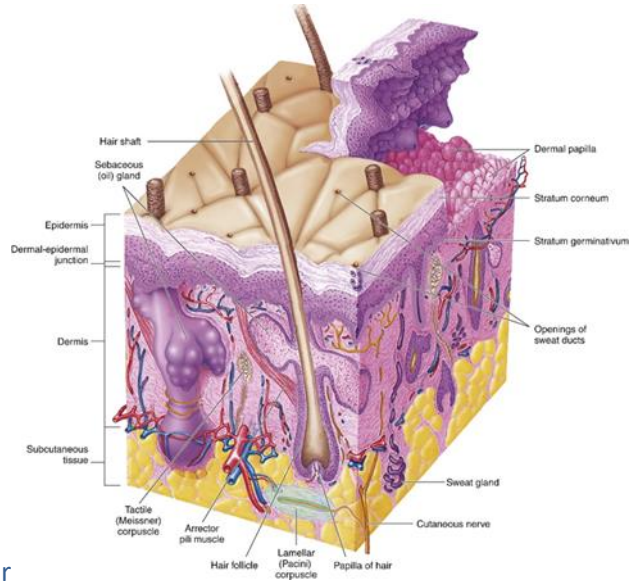


Image 1 – Clinical Key Elsevier

Functions of the skin

The skin has Six key functions [1]:

- The first line of defense against bacteria and Ultraviolet Light (sunlight) and a complex immune response
- Sensory receptors detect touch, pressure, heat, pain and cold.
- Protection to the internal organs from exposure to the external environment, prevents drying out of the underlying cells and organs
- Help to maintain body temperature
- A way to excrete excess water and waste products though the sweat glands
- A process to convert Vitamin D from sunlight

The skin is like a cell factory producing plump cells surrounded by fats and oils (sebum), which hold the skin cells together [1,2]. This process of cell development takes around 28 days, after which the cells are lost or shed from epidermis [1,2]. The structure of the epidermis is often likened to a brick wall: the bricks being the skin cells and the oils surrounding the cells being the cement [1,2]. This image illustrates how the skin acts as a barrier to the external environment [1,2].

Image 2- comparison of healthy and dry skin [1]:

The process of ageing results in skin changes [1,2]. You will notice in the older person their skin is not smooth, dries out quickly, and is not as firm as it was [1,2]. In ageing skin, the process of cell renewal is slowed down making it less healthy than younger skin [1,2]. The water and fat levels reduce as we age. Emollient is the cornerstone to help lubricate the skin surface increasing the skin's flexibility and strength [3].

Quality of Life

It is important to recognise that an older person's quality of life can be significantly impacted by age-related skin changes. We must not underestimate the importance of the skin as the organ through which we interact with the outside world [1,2]. Our psychological and social well-being are affected by what our skin looks like and how we feel about it [1,2]. Some grow old graciously and others the ageing process can create changes that impact negatively on the person.

Key Points

- Skin changes as we age are inevitable.
- An understanding of the age-related changes that are affecting the skin will have an impact on how we recognise problems and provide practical solutions to the everyday skin care changes experienced by the older person.

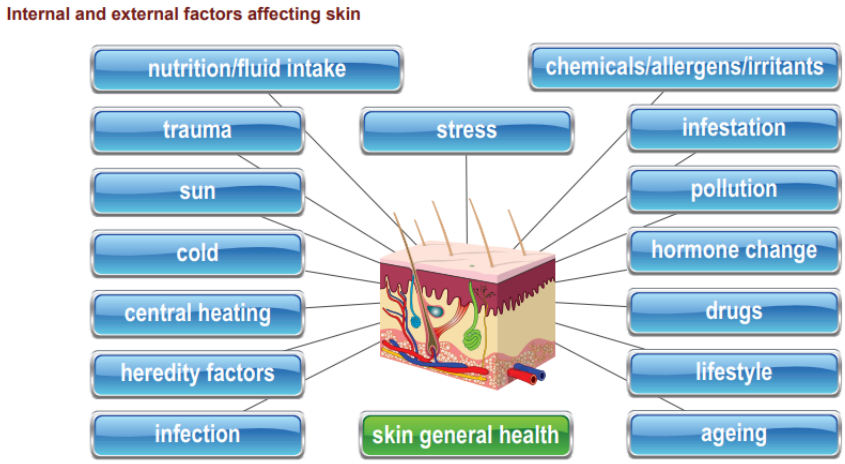
2. Skin Assessment

Assessing the skin is an ongoing process which requires great sensitivity, remembering that as the resident's dementia deteriorates, they will find that verbal and non-verbal communication more difficult [4].
Interventions that can be used with such residents include person-centered communication, which involves giving the person enough time to respond and then verifying his or her viewpoint [4]. Showing empathy for the person's experience and feelings can also improve communication and assist when assessing their skin [4].
Be aware that empathetic communication with the person has the potential to be sacrificed for the practical 'bed and body' issues of care. This may be at the detriment of the person's individuality [4].

Table 1 [2] below describes changes you may see in elderly skin and the consequences of these changes.

Changes in the Skin	Consequences
Slower epidermal turnover	*Thinner skin*
Reduced barrier function	*More prone to infection and dryness*
Reduced flexibility and softer collagen	*More prone to wrinkles and shearing*
Less evenly distributed melanin	*More prone to sun damage*
Fewer sweat glands	*Less effective temperature control*
Reduced sebum production	*Increased skin dryness*

Also consider other factors which may impact on the skin. The diagram below shows the internal and external factors which can impact on the skin[2].



Remember the residents may not be able to inform you of any skin problems that they may have, attributing them to old age. It must be stressed the importance of maintaining the person's dignity, and minimising the likelihood of embarrassment must be considered at every assessment [4].

Skin assessment should be an ongoing, multidisciplinary process that includes history taking and examination, the patients physical, emotional, and psychosocial effects are also to be noted [4].
Finch (2003) advocates using your four senses when assessing to look, listen, touch, and smell [4].

Common Skin Problems

Xerosis or dry skin is characterised by a loss of moisture due to a skin barrier defect [1,3,4]. This can be reversed through the regular application of emollients (moisturisers).

Without regular application of emollients, the skin can crack, leading to itching, bleeding, and infection [4].
Itching is a symptom not a diagnosis or a disease but can plague older people [2]. Itch is a sensation which triggers the urge to scratch, is unpleasant and poses a threat to skin integrity [2].
It is useful to understand the possible cause of itch which, in the person with dementia is not always easy to identify, for instance when there is no evidence of a rash [2].
Itching may be triggered by [2]:

- Environmental causes – heat, sweating, clothing
- Physical/psychological causes – fatigue or emotional distress
- Medical conditions – renal failure, iron deficiency or diabetes
- Infestation – If there is a sudden onset of itching, investigate for scabies, especially in a care setting

Management of itch should include prevention, identification, and treatment of the underlying problem wherever possible.

Reflection Activity 1

Think about a time when you had itchy skin such as an insect bit or a rash. Describe how your skin felt at that time and how you would feel if this lasted for weeks or months.

3. Wound Healing

The Wound Healing Process

Now you have a better understanding of the skin and it being our body's most accessible organ, it is clear how easy it is to damage or wound it. When you injure the skin, the body tissue loses its continuity.

When the skin is injured or damaged, a wound is created. Once this happens, the body immediately begins to repair itself. It does this by re-establishing tissue integrity in order to restore the skin's barrier function [1, 5].

Does dementia affect the likelihood of healing? While older people are generally at a higher risk of sustaining wounds the Alzheimer's Society (2016) has identified further impediments to wound healing experienced by people living with dementia [5]. These include [5]:

- Movement and walking
- Frailty: this results in loss of protective fat tissue or muscle mass, and the skin can become thinner
- Poor diet and dehydration: not eating and drinking well can lead to weight loss and malnutrition, and increase the risk of skin ulcers
- Incontinence: moisture from leaks can cause skin maceration and damage
- Agitation or restlessness: rubbing of clothes or objects, often over the heels or elbows, damages the skin, increasing the risk of ulceration
- Medication: some medicines may cause skin dryness or drowsiness, leading to reduced movement
- Communication: the person may be less able to express pain or a desire to move

Because of any or all these features' people living with dementia can be vulnerable to developing not only wounds but also subsequently chronic wounds that continue to deteriorate or become hard to heal because of their multifactorial aetiology [5].

How wounds heal

Wound healing is the physiological process the body uses to replace and restore damaged tissue [1]. It involves a complex interaction of physical, chemical, and cellular events.

The body uses two mechanisms to heal:

1. Tissue regeneration; and
2. Tissue repair

The following table outlines the cellular process of each of these mechanisms.

Table 2: Tissue repair mechanisms

Tissue regeneration	Tissue repair
Tissue regeneration is when the body replaces damaged tissue by replicating identical cells. This is the ideal healing method. The regenerated tissue has the same function as before, and the skin resembles its original appearance. Unfortunately, the body can only regenerate certain cell types, such as epithelial cells [1, 5,]6. An	Tissue repair is when the body repairs damaged or destroyed dermal or subcutaneous tissue. However, in this case, the repaired tissue loses its specialised function and original structure. This is a more complicated process, which causes scarring and changes the skin's appearance[1, 5, 6]. An example is a Stage 3 or 3 pressure injury,

example is mucosal tissue, or a superficial wound such as a blister with serous fluid, or a stage 1 pressure injury	chronic lower leg ulcer, or a Diabetic foot ulcer.

Evidently, wound healing is a very sophisticated process that follows a set sequence of events. The following table outlines the four healing stages a wound will go through.

Table 3 Wound Healing Stages [1]

Stage of Healing	Effect on healing
Stage 1 Haemostasis	When an injury damages the blood vessels, the body's first reaction is to stop the flow of blood, a process called 'haemostasis'. The body activates platelets and releases growth factors. The release of these growth factors starts the healing process [1].
Stage 2 The inflammatory response	Once phase one is complete and your body is no longer bleeding, your body activates its key defence mechanism – inflammation. This phase works to kill bacteria and remove debris with white and other blood cells. Inflammation ensures that your wound is clean and ready for new tissue to start growing. This phase can be the most painful of all. It is often when you'll notice some reddening, heat, and pain as your blood rushes to the wound to clean it. Inflammation generally takes up to six days and should go away [1].
Stage 3 Proliferation	During this stage, macrophages produce a variety of substances that cause the body to produce new tissue and blood vessels – a process called angiogenesis. The new tissue then fills the wound bed.6 In the final stage of proliferation, the wound edges slowly start to contract and move closer together.
Stage 4 Remodeling	Re-modelling starts already in the proliferation stage and continues for an extended period. Collagen plays an important role in this stage of the healing process. Throughout this stage, the body simultaneously produces and breaks down collagen. It does this to maintain a balance between the need for tensile strength and the re-modelling of new tissue. This balance is what determines the scar tissue's final quality and appearance [1].

The following web link will take you to a YouTube clip outlining the above table.

Web Link 1

	View screening: Wound Healing Process https://www.youtube.com/watch?v=u7Ryg9nVFLI

How long does it take for a wound to heal?

Wounds can be divided into two categories: acute and chronic wounds. Acute wounds repair themselves quickly and with minimal complications. If a person is healthy, an acute wound should heal within three weeks. In such cases, re-modelling normally occurs within the next year or so.

However, if a wound gets stuck in one of the four healing stages, it might become hard-to-heal or chronic [14].

Understanding Moist Wound Healing

Moist wound healing is a key concept in successful wound management. Moist wound management has been scientifically established and has a substantial body of evidence-based practice to validate its use in the clinical environment [4]. In most wounds the rate of healing is increased by approximately 40 percent [3]. Fragile epithelial cells migrate more freely and remain viable longer in a wound that is not dehydrated or covered by a scab formation [5]. Epithelialisation occurs more quickly if a moist wound healing environment is maintained.

Factors Effecting Wound Healing

There are many factors that can impact on the normal process of wound healing such as [3]:

- Local factors for example the presence of a foreign body in the wound
- Systemic causes, for example, nutritional insufficiency
- Ongoing trauma to the wound

A thorough assessment will assist in identifying factors that are likely to inhibit the healing process. During the process of wound healing a delicate balance must be maintained to promote the repair of damaged tissue [7]. Wounds will be slower to heal when less than favourable conditions exist [7]. Some of these conditions can be identified and corrected; some cannot.

Wound healing is affected by several factors, some of which are local, for example, the presence of a foreign body in the wound; others are systemic, for example, nutritional deficiency [1]. One of the purposes of conducting assessments is to identify those factors which are likely to inhibit the healing process [3]. The factors outlined in Table 3 can alter the characteristics of the skin and therefore influence the maintenance of skin integrity. These same factors can also influence wound healing.

Table 4: Factors that affect Tissue Integrity

Factors	Explanation
Tissue perfusion and oxygenation	The perfusion of tissues with oxygenated blood is critical for maintenance of tissue integrity and is also essential for tissue repair. Although it has been discovered that hypoxia in the wound bed acts as a stimulus to endothelial and fibroblast replication, the desired response to this stimulus is dependent on adequate oxygenation at the wound periphery [3].
Nutrition	Many nutrients are involved in promoting new tissue formation: suppressing oxidation of tissues, free radical scavenging and improving wound function. Adequate nutrition helps to maintain immune competence and decrease the risk of infection [7]. Starvation or protein deficiency in the client with a poor nutritional status enhances the influence of steroids resulting in suppressed immunity. ***Protein*** is essential for collagen synthesis, epidermal proliferation, immuno-competence, and prevention of infection. The average adult needs 0.8-0.9 G/kg a day for maintenance. Higher amounts are needed in older patients or those with significant wounds or infection. ***Vitamin C*** is an essential factor for collagen synthesis and for maintenance of capillary wall integrity. The recommended daily allowance is 60mg but studies have shown that significant losses occur from severe wounds. ***Vitamin A*** has been found to be beneficial to those patients receiving

	corticosteroids as this serves to counteract the adverse effects of steroids on wound healing. In high doses it has been found to exacerbate the inflammatory response and impede wound healing. ***B complex vitamins and copper*** are required for effective cross-linking of collagen fibres. ***Iron*** is needed to support oxygen transport and is also a cofactor needed for collagen synthesis. ***Zinc*** is a necessary cofactor for collagen formation and protein synthesis. Factors such as stress, weight loss and chronic steroid administration have been found to depress serum zinc levels. While zinc supplements are necessary to correct deficiencies the administration of zinc to patients with normal levels remains controversial [7] For example: 1 medium orange = 70mg Vit C 1 egg = 6g protein 1 roast chicken breast = 53g protein 1 cup cottage cheese = 27g protein 1 cup whole milk = 8g protein
Hydration	In addition to nutrition, fluid balance is important. Dehydration can result in diminished healing ability as water is a major component of healthy cells [5]. A large wound may produce exudate with significant volumes of fluid that can result in electrolyte imbalance as well as dehydration [5]
The presence or absence of infection.	Wound infection prolongs the inflammatory stage, induces additional tissue destruction, delays collagen synthesis, and prevents epithelialisation. It is however, important to recognise that all dermal wounds are contaminated but not all wounds are infected see 7.4 for further information on infection[3]
Diabetes mellitus	Poor control of blood glucose level has an adverse effect on wound healing by reducing Macrophage levels during the inflammatory stage. Macrophages rid the wound of dead bacteria and foreign matter and stimulate the fibroblasts to produce collagen. Wound healing in the patient with Diabetes Mellitus is often impaired as they are more susceptible to: - neuropathy - ischaemia - infection [3]
Rheumatoid arthritis	Arthritic changes associated with inflammation, swelling and reduced mobility can inhibit healing. Prescribed anti-inflammatory drugs and steroids impair healing by suppressing the inflammatory response and thus predisposing the wound to infection [3]
Immunosuppression	Any disease or medication, which will suppress the immune system, and thereby increase the risk of infection, will increase susceptibility to tissue destruction and impede the repair process [3]
Other systemic factors	Any systemic condition that adversely affects the health of the individual can promote tissue destruction and impair wound healing. Renal and hepatic disease, malignancy, incontinence, stress, sleep deprivation,

	uraemia, inflammatory bowel disease, anaemia, reduced vascularity, obesity, disorders of sensation or movement can all impact wound healing [3]
Drug therapy	***Non-steroidal anti-inflammatory drugs*** suppress the inflammatory phase of healing by blocking prostaglandin synthesis. ***Cytotoxic drugs*** interfere with cell proliferation and have the capacity to seriously impair healing and reduce tensile strength in the wound. ***Steroids*** suppress immunity to infection and when present before injury they suppress multiplication of fibroblasts. ***Immunosuppressive drugs*** reduce white cell activity and delay the clearance of debris. The risk of clinical infection is also increased. ***Penicillin*** releases penicillamine. Penicillamine reduces wound strength by preventing collagen cross-linking [7,10,11]
Hypergranulation tissue	Hypergranulation tissue is the excessive proliferation of granulation tissue that overlaps the wound edges sometimes termed *proud flesh*. The presence of hypergranulation is a deterrent to epithelialisation, as epithelial cells have difficulty transferring to the mound of granular tissue, which can result in a rolled epithelial border [11,12]. There are many methods available to help reduce and control hypergranulation [8]. However before using methods to control hypergranulation tissue, it is important to rule out the possibility of malignancy in any hyper granulating wound as these two conditions may present with similar characteristics [11]. The following is a list of methods to control hypergranulation, beginning with the easiest (should use first) to the more invasive methods [11]. It must be kept in mind that there is very little evidence to confirm that these treatments are safe and effective. Prior to the use of any of these methods the following are performed: communication with the health service team, a full, comprehensive patient assessment, a clinical examination and any required investigations, for example: tissue biopsies [11,12]. - Use of ***pressure*** against the wound base, this can be achieved by using a roll of gauze or foam over the top of the dressing, this should be changed daily and the wound bed reviewed for reduction of hypergranulation. - ***Polyurethane foam dressing*** can be effective in drying out the hyper granulating tissue, therefore reducing the hypertrophic growth. - Some facilities or units have used a ***hypertonic saline*** dressing on hypergranulation. This dehydrates the hypertrophic growth. - In some wound sites, pressure may not be suitable to use, and the patient may not be able to tolerate hypertonic saline dressings, or may be sensitive to foam. The medical officer may prefer to *use* ***silver nitrate sticks***. These sticks will cauterise the hypertrophic growth, but be mindful to warn the patient that they may experience a burning or stinging pain after application. Only an experienced practitioner

	should use nitrate sticks [11].

Key Points

This unit has examined the wound healing process and explored factors which can influence tissue integrity and delay healing.

Reflection Activity 2

4. Wound Assessment

Optimal wound management starts with a holistic wound assessment. This will help to set management goals more efficiently, which will increase the potential for better treatment outcomes. The success of any management plan relies heavily upon patient engagement and participation [15].

Wound assessment is an essential part of wound management and can be defined as information obtained using:

- Observation
- Questioning
- Physical examination
- Clinical investigations

This information is then pulled together to formulate a management plan.

Wound assessment must be comprehensive and holistic, performed at each dressing change and should cover the following key elements:

- Assessment of the resident and social context
- Assessment of the wound bed
- Assessment of the wound edge
- Assessment of the periwound skin

Completing a comprehensive wound assessment will guide you in correct identification of wound management goals and selection of evidence based wound treatments and interventions. The next section will outline a systematic approach to wound management "T.I.M.E.R.S"

Web Link 2

	View screening: Assessment of Wounds https://www.youtube.com/watch?v=s76P1DdtBAA

Reflection Activity 3

Review your facilities wound management and skin integrity procedures to ensure you are up to date with the expected actions when undertaking any wound or skin integrity assessments.

Key Points

- We have discussed the components of a comprehensive wound assessment and the importance to undertake a holistic assessment
- Examined the assessment of wounds, taking into consideration patient history, the type and category of wounds, the surrounding skin, and pain.

5. Management of the Wound

Wound Bed Preparation (WBP) describes an approach to wound management aimed at removing barriers to healing and/or stimulating the healing process and highlights that successful diagnosis and treatment of patients with chronic wounds requires holistic care using a team approach [21] [22].

WBP is a strategy that assists Health Care Workers to consider the various individual components of wound care, while at the same time maintaining a global view of what is to be achieved [21].

WBP provides a framework for enhancing wound healing capacity by bringing together key aspects of wound management. There are four main elements to this approach, and they are represented by the acronym "TIMERS", which is detailed throughout this unit [22].

Tissue management

Inflammation and infection control

Moisture balance

Epithelial edge advancement

R

S

Although interrelated, the relative importance of each intervention will vary with each wound.

Pain

Pain is a subjective and common experience for people living with wounds. Wound-related pain can be temporary (acute) or persistent (chronic) [20]. Acute wound pain can be exacerbated whenever the wound is being handled or manipulated, with dressing removal, wound cleansing, or debridement. In contrast, persistent (chronic) wound pain is the background symptom that is present at rest and between wound-related procedures including dressing changes and patient repositioning [20].

Wound pain is often underestimated by health professionals and can lead to muscle tension, fatigue, and anxiety, which if inadequately managed can delay healing by depressing the action of the immune system [5]. Patients who are anxious and in pain will have an increased risk of wound infection due to the stimulation of glucocorticoids, which will suppress their immune system and

reduce the normal inflammatory response [16].

It is of paramount importance that pain, and anxiety levels are adequately assessed and that appropriate interventions are administered and evaluated. Wound pain can be assessed using a pain scale such as the numerical rating scale (0-10). It is also important to consider and eliminate factors that exacerbate acute wound pain.
Items to consider include [16]:

- Is an agent being used which is known to provoke an irritant response?
- Is the dressing being changed too infrequently?
- Is the wound infected?
- Is the dressing being changed unnecessarily?
- What is the condition of the surrounding skin?
- Is there the presence of infection and what are the details of the swab/biopsy result?

Adequate pain relief will reduce stress response and fatigue, increase the resident's ability to mobilise and improve circulation and oxygenation.
Although many health professionals are aware of the potential for pain in relation to procedures such as dressing changes, they all too often fail to manage pain effectively prior to, during and post procedures especially dressing changes [19].
Wounds will always be painful to some extent, and much can be done to control the impact of pain on patients [19]. Always ensure pain assessment and need for pain relief prior to any wound assessments and dressing activities.

Tissue Management

Necrotic material (black/brown tissue), the most obvious marker of a chronic wound, can be both a focus for bacteria and a barrier to healing [19]. The initial debridement and ongoing maintenance of necrotic tissue in the context of WBP reflects the need to respond to a dynamic situation within the wound [19]. Debridement, except for surgical excision, is rarely completed in one treatment episode; rather a "mixed" wound is created with some areas still containing necrotic material and bacteria [19].

Inflammation and Infection Control

Chronic wounds are often heavily colonised with a variety of bacteria, although often not in sufficient quantity to cause signs of infection [24]. When the burden of bacteria in a wound results in wound infection, the inflammatory phase of healing will be prolonged. This causes further tissue damage, delay in collagen synthesis and epithelialisation, often causing distress and discomfort for the patient. Infection is a commonly occurring clinical problem contributing to a delay in wound healing. Evidence suggests that many health professionals have trouble when diagnosing wound infection, for example, the presence of slough or bacteria in a wound does not necessarily indicate that the wound is infected [24].

A patient's wound should be carefully assessed at each dressing change for signs of infection, care taken to avoid either the under or overestimation of wound infection. Only if infection is suspected or is clinically justified should a bacteriological sample (swab) be taken [24]. Many wounds are swabbed routinely if the presence of erythema and or oedema is noted, even though these signs are normally seen during the inflammatory phase of healing. The main reason for taking a swab is to identify the organism and the appropriate antibiotic to treat the infection [24].

Hand washing is the single most important technique in preventing and controlling the transmission of pathogenic micro-organisms. Contaminated hands are the primary cause of cross-infection within a clinical [25].

Moisture Balance

A certain amount of wound exudate is normal in a wound as it performs the functions of cleansing the wound and providing nutrients to healing tissues. Exudate or moisture is important to maintain a wound environment that encourages healing as well as prevent dressing adherence [26]. However, for chronic wounds the wound exudate may delay healing and exudate can cause damage to surrounding skin, loss of protein and encourage bacterial growth [26].

Excess exudate may be a result of infection, autolytic debridement or because of wound aetiology, for example malignant fungating wounds. Excess fluid in the tissues due to oedema or lymphoedema will also increase exudate. Therefore, the control and prevention of these conditions are important steps in reducing exudate production [25, 27]. Exudate management consists of two related management phases: direct management such as the use of absorbent dressings, compression bandaging; and adjunct therapies such as topical negative pressure and indirect management such as control of heart or renal failure [27]. Frequently both methods need to be combined to manage exudate.
A thorough wound assessment includes assessing exudate. The characteristics of wound exudate are colour, consistency, type, amount, and odour; this also includes inspecting the dressing [5].

Table 4 outlines the different types of exudates that can be present in wounds [5].

Table 4: Exudate Types [5]

Serous	Clear straw –coloured fluid
Haemoserous	Slight blood-stained serous fluid
Sanguineous	Frank or heavily blood-stained
Purulent	Containing pus

Exudate Colour

The colour of exudate can be a good indicator of the type of bacteria that is present in the wound; For example, Pseudomonas has a blue or green colour [5].

Exudate Odour

This relates to wound infection or contamination of wounds by body fluids such as faeces. Sometimes the type of dressing will influence the odour of the wound; for example, hydrocolloids can have a distinct malodour due to the autolysis of necrotic or sloughy tissue under occlusion [3].

Exudate Amount and Consistency

There is no easy and accurate method to measure wound exudate. What might be considered a significant amount of drainage for a smaller wound may be considered a minor amount of drainage for a larger wound, making clinically meaningful assessment of exudate more difficult [5]. One method used in wound clinics to estimate wound exudate is as follows:

Table 5: Exudate Amounts

Exudate "Guestimate" Guideline [5]

Large	Strikethrough (appearance of exudate) to outer bandages within the twenty-four-hour period.
Moderate	Strikethrough within forty-eight hours or no strikethrough but need to change dressing daily as it is sodden.
Minimal	Contained well by the dressing over three or more days.

Assessment of the amount of exudate is subjective as it depends on the Health Care Workers ability to judge the amount. One possible method of quantifying changes in exudate formation is by monitoring the change in the number of dressings required in a set period. Exudate consistency relates to the type of exudate, for example serous exudate would have a watery consistency. The consistency of exudate is most significant in oedematous wounds or fistulae.

Epithelial Edge Advancement

Studies into the microenvironment of chronic wounds have found an impaired wound 'matrix' in chronic wounds, where changes have occurred in the remaining cells causing them to become senescent (old) or unresponsive to growth factors [21]. It is also likely that tissue ischaemia also plays a role, as prolonged hypoxia impairs the healing process. These chronic non-healing wounds become lodged in the inflammatory phase of wound healing.

Surrounding Skin

Maintenance of the peri-wound area is important as failure to consider the integrity of this area can result in larger wound margins (increasing wound size), maceration, and fragile skin becoming affected with eczema, trauma to skin from removal of tapes, allergic reaction, and dryness of skin [5].

Wound Cleansing

Traditionally, the cleansing of any wound has been approached with a dressing pack containing cotton wool swabs, forceps, and some type of antiseptic solution or normal saline to clean the wound prior to the application of the dressing product [19]. In recent years, this approach has been questioned, with the revelations that swabbing wounds, regardless of the technique used, resulted in the redistribution of micro-organisms, rather than their removal, and the destruction of new growth granulation tissue [20].This has resulted in many Health Care Workers rethinking this whole aspect of wound cleaning, and indeed, many now recommend that we first ask the question "Does this wound require cleaning?" before deciding on the most appropriate method of cleaning [20]. The cleansing practice can be a shower with dressing removal or a gentle normal saline irrigation of the wound bed.

Wounds are best cleansed with potable (drinkable) tap water or normal saline which will not harm living tissue [20]. Solutions used should be warmed to body temperature to promote mitotic activity in the wound. On opening of any solutions place a date and time on bottle once open. Dispose of any open, unused Normal Saline or aqueous based solutions after 24 hours.

The cleansing of wounds can be done by either irrigating the wound using a 30 ml syringe, a sterile-squeeze container of normal saline or by showering. There is a risk of occupational exposure from splashes to mucous membranes during cleansing always wear appropriate Personal Protective Equipment (PPE).

There is no benefit to cleaning a wound using gauze swabs as all variations of wound swabbing result in redistribution of the pathogens, rather than removal. There are instances where swabbing is required due to location i.e., between the toes, tracheotomy site [3, 20].

Documentation

The Australian Wound Management Association Standards for Wound Management outlines that documentation will provide a legal, comprehensive, chronological record of the individuals wound assessment, management, and prevention plan [13]. Documentation of all areas related to wound healing is every health care worker's responsibility. Often the use of a wound care pathway or specific wound care plan assists with the documentation and monitoring of the wound progress.
The following information needs to be accurately documented [5].

- Type of wound
- Location and position of the wound
- Wound measurements and a tracing
- Clinical appearance of the wound i.e. granulation, slough etc.
- Condition of the surrounding skin
- Type, odour, amount of exudate
- Amount of patient's pain/discomfort/anxiety
- The treatment that the patient was having at home
- If surgical, type of wound closure, any drains, etc.
- Management plan including discharge planning needs
- The type of cleansing solution
- Type of dressings/bandages
- Frequency of dressing changes
- Other equipment if required
- Details of pain management

As the wound heals, the dressing regime will change, this is expected, what is harmful and wasteful are multiple dressing reviews and changes over a short period of time. Remember there are now dressings that can stay in place for 1-7 days [7].

Wound Measurement

It is important to keep accurate clinical records of the progress of wound healing in order to determine whether progression or deterioration of the wound is occurring as measurement of the wound can help to identify the efficacy of prescribed care. There are a variety of methods available for measuring wounds. Choice will depend upon the resources that are available, the wound type and location.

All wounds require a two-dimensional assessment of the wound opening (tracing) and a three-dimensional assessment of any cavity or tracking. Tracings of the circumference of the wound may be recorded on transparent plastic or acetate sheets using a marking pen.

Three dimensional measurements can be achieved by using a sterile probe, a wet cotton- tipped applicator or a catheter [19]. The length of the instrument inserted into the wound is marked with forceps or pen and measured following removal. Document any tracking or shelving under the intact wound bed by using directions (arrows) as represented by the times on a clock face see figure 1 below [7].

Figure 1 – Orientate clock face towards patient's head/long axis of the body part

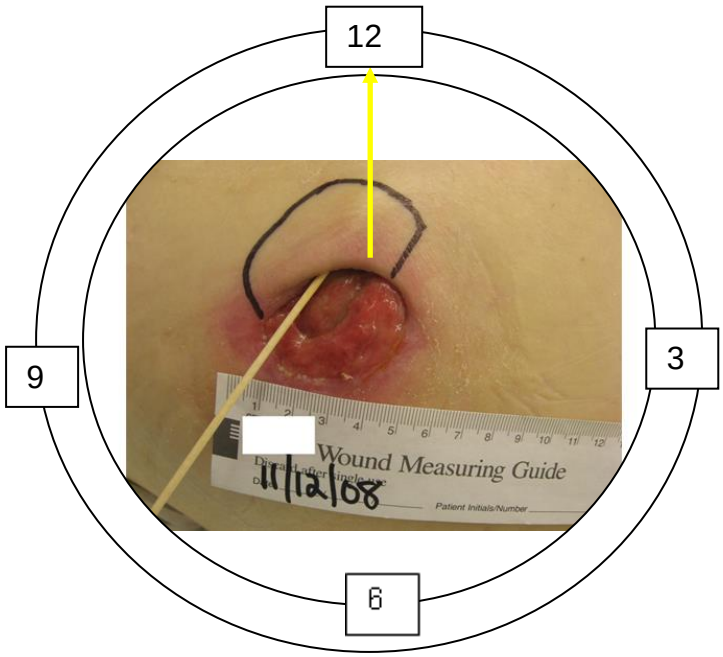


Image sourced from http://portal.pedagogyeducation.com/Demo/Content/34/1539/5.aspx

Reflection Activity 4

Consider current methods of measuring wounds in your facility. What would you change to improve how this undertaken?

Key Points

This unit has evaluated wound bed preparation using the acronym TIMERS as a framework on how to practically manage different wound types with their own unique challenges.

6. Wound Dressings

Determining the aetiology of a wound is a priority as this will assist in establishing the appropriateness of the treatment options available. After initial wound assessment the decision on which intervention or wound dressing to use is made. Wound dressings are complex and come in a multitude of varieties and can be grouped into several different types. The following is an overview of the most common types of wound dressings and their uses [1, 6].

Characteristics of an Ideal Dressing

There is a multitude of dressing products available for use, and the range of products is increasing as new and improved wound management products are being developed because of study findings [1]. As effective wound management relies heavily upon the selection and application of appropriate wound dressings, it is important to discuss what dressings to use for patients with experienced clinicians. The classification of properties of wound dressings is often complex for beginners undertaking wound care.

Two classification methods are:

- Composition (make up of product)
- Function (role of the dressing for example, hydration, absorbency etc.)

Several properties have been identified as the appropriate requirements for optimal wound dressings. These requirements underpin the framework for the development of many modern wound-dressing materials.

The following characteristics describe an ideal dressing [1, 6]:

- Non-adherent
- Impermeable to bacteria
- Capable of maintaining a high humidity at the wound site while removing excess exudate.
- Thermally insulating
- Non-toxic and non-allergenic
- Comfortable and conformable
- Capable of protecting the wound from further trauma
- Requires infrequent dressing changes
- Cost-effective
- Long shelf-life
- Available both in hospital and the community.

Dressing Types

There is a wide variety of dressing products currently available on the market with new products being constantly developed. To simplify the selection of wound management products, dressings are usually classified according to generic name. Appendix one will give you an overview of these groups with examples of dressing types. Identifying dressings by their categories and generic names rather than by brand name will save confusion when trying to identify the dressings on the shelf.

Reflection activity 5

Review your facilities products are you able to easily identify the categories and indications for use of the current products?

Key Points

- It is important to understand appropriate wound care and selection of wound care products.
- It is important to understand the importance of keeping wounds clean, managing the wound bed, and promoting wound healing, this reduces the person's potential for developing a non-healing wound and increasing the risk of infection.

7. Clinical Practice Application of Wound Management Principles

In this section, the clinical application and integration of the information provided in the previous sections will be explored. Whilst the section discusses management principles, we strongly suggest that you utilise your organisations protocols, and wound resource to provide specific guidance. It is regularly quoted that if you treat the cause of the wound and manage the factors delaying the wound healing your wound will heal [1,7]. This sounds simple but requires a team approach. It is widely accepted that a wound that is unchanged over a four-week period requires referral to adjust the management regimen.

Skin Tears

Definition: A wound caused by **shear, friction**, and or **blunt force** resulting in separation of skin layers [8]. A skin tear can be partial-thickness (separation of the epidermis from the dermis) or full-thickness (separation of both the epidermis and dermis from underlying structures) [8].

Skin tears are an increasing problem for all healthcare practitioners. If appropriate treatment is not given, these injuries may become **chronic wounds,** causing unnecessary **pain and distress** [2].

We need to be aware of how to prevent skin tears and if a skin tear does occur, we need to understand how to assess and manage appropriately [1].

Age related skin changes associated with skin tears:

Thinning of the layers of the skin was described in section one. These changes will make the skin more vulnerable to damage such as skin tears [2]. Additionally, other factors may also impact on fragility of the skin.

These would include:

- Immunological status
- Malnutrition
- Poor circulation
- Oxygen intake

Prevention of skin tears

Prevention starts with early identification and assessment of individuals who are at risk. Based on available evidence the consensus statement of an international panel suggests the following strategies should be part of prevention [2].

These are [2]:

- Risk assessment on admission or when the individuals condition changes and document findings in their care plan
- Encourage wearing of long sleeves, long trousers, or knee high socks
- Provide limb protectors for residents with history of falls and skin tears
- Ensure safe patient handling techniques and equipment/environments
- Educate all staff and care givers of safe patient handling techniques
- Involve residents and families in prevention strategies
- Ensure adequate nutrition and hydration, if necessary, refer to a dietician
- Keep skin well hydrated with emollient (moisturiser) therapy. Recent research by Carville et al 2014 has shown that the application of moisturisers twice daily reduced the incidence of skin tears by almost 50% in residents living in aged care facilities

- Encourage individuals and their carers to apply moisturiser
- Protect individuals at high risk of trauma during routine care from self-injury

Practical advice on maintaining a safe environment to minimise the risk of skin tears:

- Check lighting is sufficient and position of furniture
- Use appropriate aids when transferring residents
- Never use bed sheets to move residents as this can contribute to damage by causing a dragging effect on the skin. Always use lifting device or slide sheet.
- Continence management if relevant

Include this practice advice in the resident's care plan where relevant.

Assessing a skin tear

The most important aspect of assessment and management is to minimise further trauma and preserve viable tissue [2]. It is important to classify the type of skin tear, as this will determine the severity and aid in planning appropriate treatment [2].

The STAR Skin Tear Classification System is a validated classification tool. It classifies skin tears into five categories. The image below outlines those classifications [23]. Use of a classification system can assist in improved description of tissue loss and may assist with guiding the management of the wound.

Image 24287-STAR-Skin-Tears-Single-Sheet-V2-APPROVED-01_04_2020.pdf (woundcare-today.com)

Management of Skin Tears

LeBlanc and Baranoski's (2020) research into skin tears made the following recommendations; a full patient assessment, review of nutrition, pain and local wound conditions [26].
Dressing recommendations include:

- ***Wound assessment*** prior to commencing or continuing management plans.
- ***Wound Cleansing*** – stop the bleeding prior to cleaning the wound, remove old blood and blood clots from the underside of the skin flap and the wound bed. Debris left in the wound will delay the healing process. Treat the skin flap gently, as it is usually fragile.
- ***Gently re-lay the skin flap*** over the wound bed and secure the flap. Do not force or stretch

the skin flap over the wound bed. The open wound area will heal by secondary intention. For full-thickness skin tears it might be useful to puncture the skin flap, with a small sharp instrument such as sterile needle, to create small drainage holes to allow any further drainage from the wound bed to escape into the dressing and prevent fluid accumulating under the skin flap. Any fluid allowed to collect under the skin flap will prevent the skin from reattaching itself to the wound bed.

- ***A skin film barrier wipe*** should be used around the peri wound area to protect intact skin.
- ***Dressing selection*** should include an absorbent wound dressing. Please follow your organisations procedure for the management of skin tears.
- ***Mark the top of the dressing with arrows*** to indicate in which direction the dressing is to be removed. This reduces the risk of the skin flap being lifted off with the dressing.
- ***Review the wound at each dressing change*** ensuring the dressing is gently removed in the direction of the arrow. Observe for signs of infection and any changes in colour of the skin flap. Hydrocolloids or traditional transparent film dressings are not recommended over skin tears as they may cause skin stripping and injury to the healing skin tear if not removed correctly [23, 25].
- ***Refer to specialist*** if the skin tear is extensive, or with uncontrolled bleeding or haematoma, or if the skin tear fails to progress.

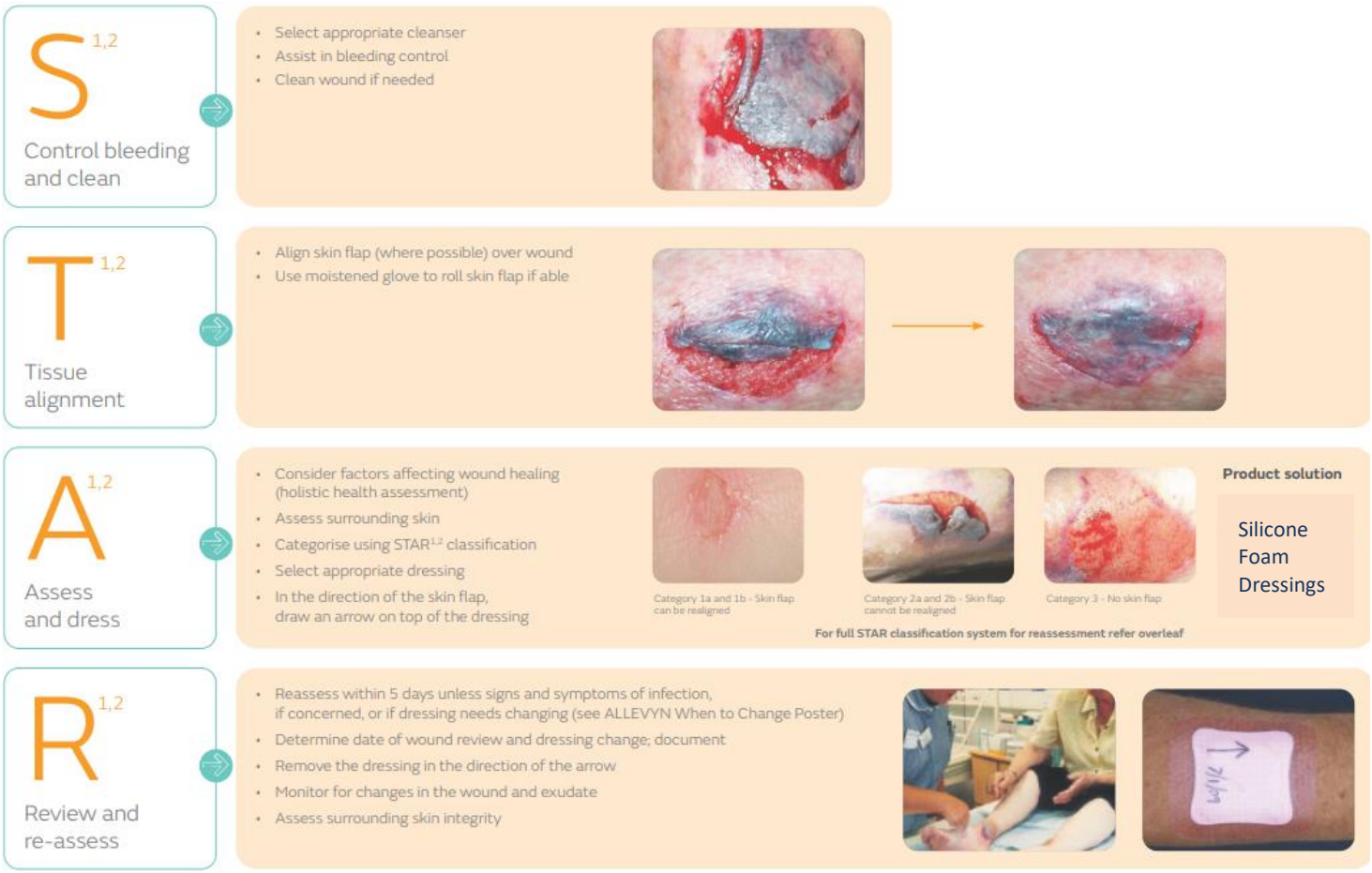


Image [24287-STAR-Skin-Tears-Single-Sheet-V2-APPROVED-01_04_2020.pdf (woundcare-today.com)]

Reflection Activity 6

From the information you have read in this section how could this change the prevention and management of skin tears in your workplace?

Key Points

- Skin tears are common wounds particularly at the extremes of age
- We should be aware of the risk factors associated with skin tears and minimise wherever possible
- When an individual develops a skin tear, the use of a skin tear classification system will aid our decision-making and ensure we are all using the same language to describe wounds
- Treatment regimes should be structured on best available evidence

Pressure Injuries

Definition: A pressure injury (PI) is defined as a localised injury to the skin and/or underlying tissue often situated over a bony prominence, often caused as a result of prolonged pressure (team).

These can affect any part of the body that is put under continuous pressure and are most common on body prominences such as the heels, elbows, hips, and sacrum [5].

Prevention of pressure injuries

Some people may be more vulnerable to developing pressure injuries than others. When you are caring for a resident, it is important to be aware of the risk factors that might cause them to become vulnerable to pressure damage.

Factors

1) Internal factors: age, health status, mobility, body weight
2) External factors: pressure, shear, or moisture

Often the resident will have several of these factors which impact on skin integrity. Some important steps can be taken to reduce the risk to residents who are vulnerable to skin damage. Image 6 below outlines the relevance of risk factors to pressure injury development.

These include:

- Inspecting the skin regularly
- Making sure all surfaces, such as the bed and chair are appropriate to the individual
- Assisting the individual to reposition on a regular basis. Remembering residents with dementia particularly those in more advanced stages of cognitive decline, are more likely to stay in one position for a long time [6]. It is important to encourage and remind them to change their position even while sitting. If they can stand, they should be encouraged to do so every couple of hours.

A structured formal risk assessment tool is to be used in all health and social care settings. The tools are to enable early detection of individuals at risk of developing pressure injuries. Strategies can be put in place to reduce risk, and if required prescribe the use of pressure-redistributing devices.

When should risk assessment be carried out?

As per Alzheimer's Qld procedure Residents are to be screened for pressure injury risk as early as possible on admission, within an 8-hour timeframe and then every 3 months or when a resident's condition changes. Remember regular skin assessment helps to identify any early changes in the skin that may lead to a pressure injury.

You are looking for areas of redness (erythema) when inspecting the skin. If an area of redness is identified compare this to skin nearby, if nearby skin appears normal in colour, the area of redness may be an early warning sign of pressure damage.

On any area of redness conduct a blanching test – this involves applying light pressure with your finger to the area. If the area of skin turns white (blanches) on pressure then quickly becomes red again after the pressure is removed, this indicates that the microcirculation is intact, see image 6.

Image 6 – RBWH skin blanching test

If the area remains red on finger pressure, it indicates damage to the microcirculation see image 7. It is vital that this damage is identified early, reported, and escalated as the sooner an intervention is implemented the sooner the area will heal and prevent deterioration to a deeper pressure injury.

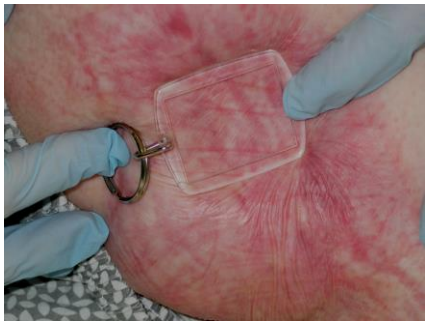


Image 7 – RBWH skin non-blanching test – stage 1 pressure injury

Management of pressure injuries

If a pressure injury occurs, we aim to heal the wound and prevent further damage. The pressure injury should be staged. See appendix 2 that outlines pressure injury stages, definitions, and images. Strategies to reduce further damage are similr to those used to reduce risk, such as repositioning more frequently and the use of pressure-redistributing devices.

Appropriate dressings should be used. The type of dressing will depend on several factors.

These include:

- Position of the wound
- Size of the wound
- Tissue type in the wound bed
- Amount of exudates
- Condition of the surrounding skin
- Known sensitivity or allergy to a dressing

There are many available dressings please see section 5 and 6 for further information.

Quality of life

Pressure injuries can be devastating for the individual, causing pain and distress, and reducing the person's ability to enjoy their regular activities. They may also require long and arduous courses of treatments and make the individual vulnerable to potentially life-threatening infections [2].

Reflection Activity 7

From the information you have read in this section how could this change the prevention and management of pressure injuries in your workplace?

Key Points

- Pressure injuries are wounds which can have serious consequences and are often seen at the extremes of age.
- We should be aware of the risk factors associated with pressure injuries and minimise risk wherever possible by applying preventative measures.
- If an individual develops a pressure injury, follow guidelines on management of pressure injuries.
- Treatment regimens should be structured on best available evidence.

Incontinence Associated Dermatitis (IAD)

Definition: Incontinence-associated dermatitis (IAD) is an irritant contact dermatitis resulting from prolonged contact of the skin with urine and/or faeces [2].

Along with these factors, the individual's overall health, cognitive impairment and concurrent medications are also involved [2]. Once **urine** and **faeces** come into contact with the skin, **fluid containing bacteria** can **penetrate the skin**, potentially leading to skin breakdown and infection [2].

The pattern of skin damage is reflective of the flow of urine and faeces around the perineal area, the skin often appears like a **superficial burn** [2].

Ongoing assessment will highlight early changes in the skin or deterioration [2]. Incontinence may be unrelated to a diagnosis of dementia, though they are more likely to be a functional issue or can be called "toileting difficulties" as they related to cognitive difficulties rather than physical problems [4]. Cognitive difficulties that affect an individual's ability to go to the toilet include [4]:

- Being unable to recognise the relevant signals to void/defaecate.
- Holding on until they recognise and reach the appropriate place once they feel the signal to urinate/defaecate.
- Failing to remove clothing as necessary.
- Forgetting to remain in/on the toilet until urination/defaecation has been completed.
- Subsequently failing to replace clothing.

Prevention and management of IAD

- Prevention begins with **regular inspection** of the skin of your residents with incontinence.
- Appropriate prompting to go to the toilet, use of chairs from which residents can rise easily from, easy toilet access, and visual cues i.e., a picture of a toilet on the door, can facilitate successful toilet visits [4].
- Skin inspection should include all areas affected by urine and faeces, the perineal area, anal cleft, between the thighs, skin folds and the buttocks.
- Using **pH balanced skin cleansers** is the main step in managing the skin of the incontinent resident. Soap and water should always be avoided.
- **Skin** should be **cleansed after each episode** of loose stool, using the non-rinse skin cleansers and soft wipes. This will help prevent excessive friction of the skin.
- **Barrier creams** should also be used to help form a protective layer of the skin, between episodes of incontinence. It is important to avoid build-up of these products on the skin, therefore the area should be cleansed at each episode of incontinence. Also remember that some products used to create a barrier such as thick Zinc cream will impede the absorption qualities of the continence product.
- **Liquid barrier films** are available containing polymers and/or silicone i.e., dimethicone, which dries on the skin – this can also be combined with the skin cleanser wipe or solution. These have been shown not to block continence pads.
- The use of **appropriate incontinence pads** is an important part of caring for residents with moisture related skin damage.

Quality of life

Skin damage is often associated with significant pain and discomfort caused by the changes in the affected area.

Key Points

- IAD occurs because of incontinence.
- They can be extremely painful.

- We should be aware of the risk factors associated with IAD and minimise risk wherever possible by applying prevention strategies.
- If a resident develops IAD, follow guidelines and procedures on management of skin damage.
- Treatment regimens should be structured on best practice.

Reflection activity 8

M the information you have read in this section how could this change the prevention and management of IAD in your workplace?

Keeping skin in optimal condition with emollient therapy

Emollient is the medical term for a **moisturiser**. Emollients are oils that spread easily to the skin, providing partial occlusion to hydrate and improve the outer layer of the skin [2].

Emollients are the cornerstone to maintaining skin integrity in the older persons skin [2, 3, 27.] This is best achieved using a three-stage approach [2].

i. Emollient soap substitute
ii. Emollient lotion, cream, or ointment
iii. Emollient bath/shower product

** Due to the oily nature of some of these products a risk assessment should be undertaken to avoid slipping or falls and only use bath/shower products that are non-oily. Talcum powder should be avoided on the older person's skin.*

The objective of complete emollient therapy is to correct some of the factors contributing to dry skin, by restoring the skin barrier and reducing the likelihood of further damage. It is important to recognise that emollients are not all the same and that advice should be guided by clinical need and informed individual choice [2].

Using emollients is a key way of helping to maintain healthy skin. They help to promote the barrier function of the skin, lubricate, soften, and make the skin less likely to be itchy and scaly. This section reviews how health care workers and residents choose and use different types of emollients.

Emollients work in two ways:

Occlusive emollients work by sealing in the moisture so that water loss is prevented from the stratum corneum (epidermis) [2].

Humectant emollients work by drawing and retaining water from below and into the stratum corneum increasing the amount of moisture there [2].

Emollient bath/shower products and soap substitutes maintain skin hygiene and ensure a feeling of wellbeing for the individual. During the everyday activity of washing skin provides the carer an opportunity to assess the persons skin condition and ensure the correct regime for care is in place.

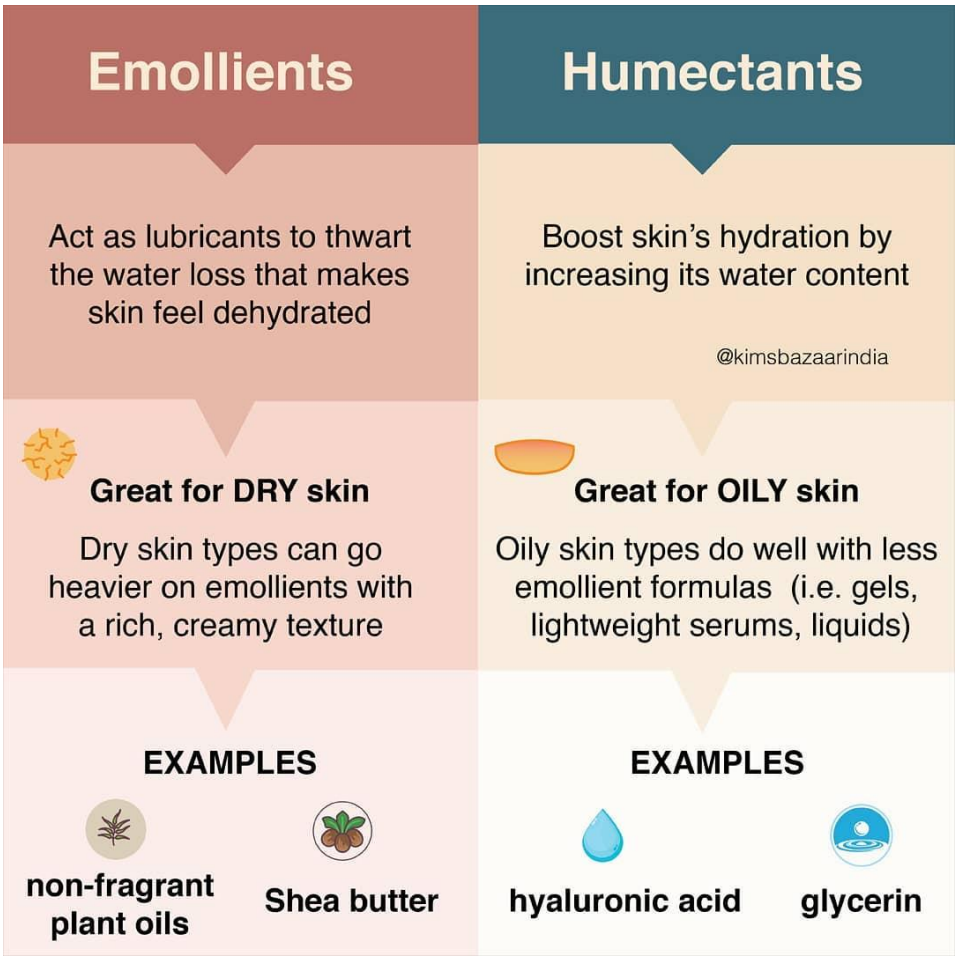
Remember that the skin is a complex environment with a unique balance of natural organisms and an acidic pH. Using soap or bubble bath will alter the skin pH and disturb the skin balance resulting in skin damage or increasing the skin's vulnerability to fungal or bacterial infection [2]. These products may also strip the skin of natural oils (sebum) which help in maintaining flexibility and limit dryness [2, 4].

Washing should always be gentle followed by thorough rinsing and meticulous drying. Areas that are left damp are prone to breaking down and attracting fungal infections. Particular attention should be given to skin folds and finger/toe webs. Whilst thorough drying is important, it should be carried out gently, rather than vigorous rubbing.

Emollient gel, lotion, cream or ointment

Emollients are put into categories [2,4]:

- **Gels** have the highest water content and are best used on hairy areas.
- **Lotions** have a low oil content and are cosmetically acceptable.
- **Creams** have a moderate oil content, are effective and cosmetically acceptable.
- **Ointments** are mostly grease and consequently very effective but not always popular.



Application of emollients

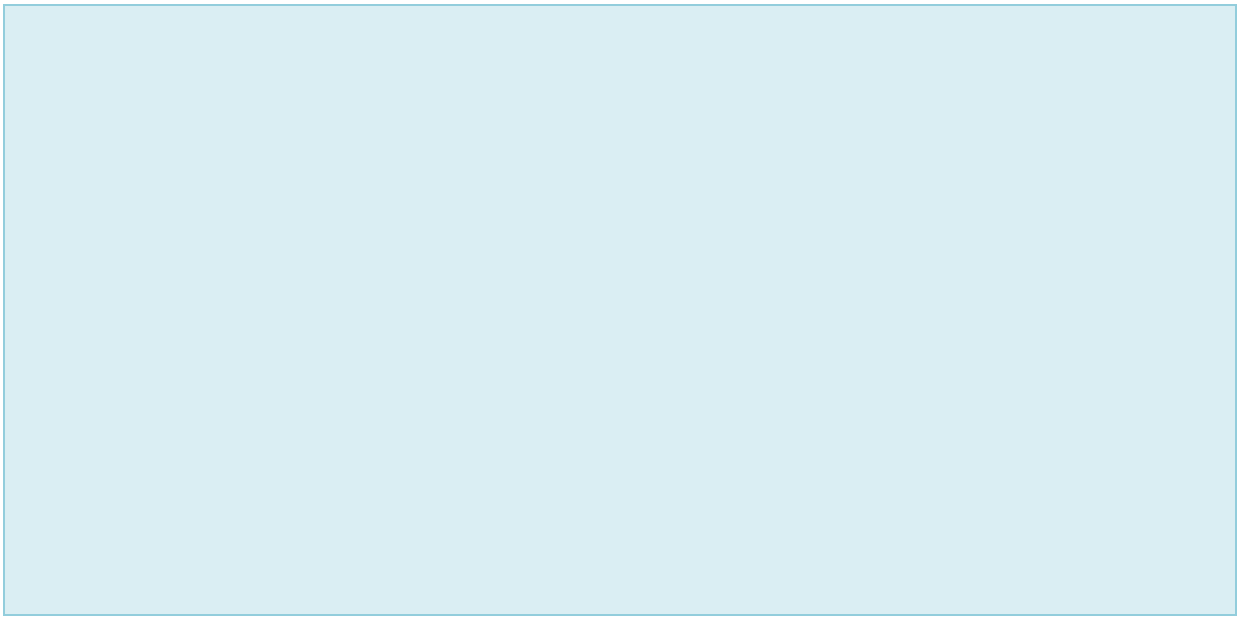
Emollients should be applied in a downwards direction following the line of hair growth [1,4]. Vigorous rubbing with an emollient can cause irritation and inflammation. It is best to apply emollients after a warm bath or shower when the skin is most receptive, but they can be applied at any time. Should the resident be having another treatment applied to their skin, e.g., a steroid, it is best applied after the emollient. It is important that the emollient is allowed to absorb into the skin. This can take around 20 minutes, depending on how dry the skin is and how greasy the moisturiser is [2, 4].

Key Points

- Emollient therapy is the cornerstone to maintaining skin integrity and individual choice is important.
- Knowledge on different types of emollients and how they work with correct application will help restore and maintain the skin's integrity and reduce the likelihood of further damage.

Reflection Activity 8

From the information you have read in this section how could this change the choice and application of emollients in your workplace?



8- Assessment

Answer the following questions.

1. Starting with the top layer and in the correct order the main layers of the skin are:
    a. Epidermis and dermis
    b. Dermis and subcutaneous layer
    c. Epidermis, dermis, subcutaneous layer
    d. Dermis, epidermis, subcutaneous layer

2. The skin has key functions. Which of the following is not a function of the skin?
    a. Protection from harmful Ultraviolet Light
    b. Temperature control
    c. Metabolism of fat
    d. a barrier to harmful bacteria

3. Tissue management involves:
    a. Control and prevention of excess tissue fluid
    b. Eliminating non-viable tissue, bacteria and cells
    c. Reducing bacterial burden in the wound
    d. Providing the wound with a covering epidermis
    e. a, b, and d
    f. a, b, and c
    g. all of above

4. If individuals experience repeat skin tears on shins
    a. Make sure legs are shaved to decrease the risk of infection
    b. Provide limb protectors
    c. Advise to wear short socks
    d. Apply moisturiser once a day

5. To prevent skin tears, you should:
    a. encourage the patient to wear short-sleeve tops.
    b. use adhesive tape on dressings.
    c. tell the patient to avoid sudden movements.
    d. avoid using skin lotion.

6. Which of the following practical advice can be given to minimise the risk for individuals who are vulnerable to developing pressure ulcers?
    a. Use bed sheets rather than anything else to move patients
    b. Advise the individual not to change position too much
    c. Only inspect the skin on the sacral area
    d. Use moving and handling aids to minimise shear injury

7. Which of the following is not part of the guidance on the prevention of IAD?
    a. Regular inspection of the skin
    b. Use a pH balanced skin cleanser after episodes of incontinence
    c. Avoid the use of incontinence pads
    d. Apply a barrier cream to affected area

8. List 3 reasons why a wound may benefit from cleansing

    1-

    2-

    3-

9. What is the safest solution for the wound to use when cleaning a wound?

10. Complete the following descriptions of wounds.

    A. Superficial tissue loss

    B. Partial thickness:

    C. Full thickness:

11. Complete emollient therapy consists of:

    a. Soap; lotion, cream or ointment; bath or shower product

    b. Soap substitute; lotion, cream or ointment; bath or shower product

    c. Lotion, cream or ointment;
    d. Soap; lotion, cream or ointment;

12. Emollients help keep the skin in optimal condition by:

    a. Allowing water to evaporate from the stratum corneum

    b. Hydrating the outer layer of the skin and restoring the skin barrier

    c. Allowing the skin to dry out
    d. Penetrating deep into the subcutaneous layer

13. Age related skin changes and skin damage can affect the individuals quality of life by:

    a. Causing stress and distress

    b. Causing pain

    c. Causing sleep deprivation and fatigue
    d. Any of the above

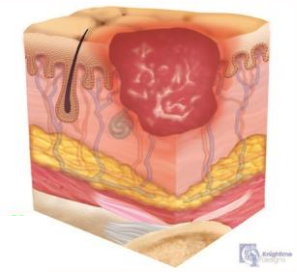
Appendix 1: Detailed List of Wound Care Products

GENERIC CATEGORY	FUNCTION	DESCRIPTION	EXAMPLES	INDICATIONS	USAGE
ALGINATES	Absorption; Packing Promote autolytic debridement	Alginate: Primary dressing derived from brown seaweed in rope or pad form, nonwoven pad or fibres composed of alginate salts. Gels as fluid is absorbed. Conformable moisture-retentive dressing which also insulate the wound.	**Alginates** Kaltostat AlgiSite M, Restore CalciCare, Sorbsan SeaSorb	Full thickness wound cavity, undermined area or tunnel. Moderate to heavy exudate; Contaminated and infected wounds. Odorous wounds with or without slough.	Loosely pack into a wound. Dressings may be layered into a deep wound. A secondary dressing is required to secure. Change up to once per day depending on exudate levels.
CONTACT LAYERS	Protect the wound base	A nonadherent, woven polyamide net that is placed in contact with the wound base. It allows passage of exudate from the wound to a secondary dressing.	Mepitel Non-Adherent Silicone Dressing, Tegapore Tricotex	Full thickness granular wounds; Minimal to heavy exudates, Donor sites/split-thickness skin grafts, In combination with negative pressure wound therapy.	Applied to the wound base with a secondary absorbent dressing cover (i. e., gauze). Contact layer stays in place up to 7 days while the absorbent layers are changed as needed.
FOAM	Absorption (minimal-heavy) Packing material Provide comfort Provide thermal insulation	Semi-permeable hydrophilic foam, impermeable barrier-Thin and traditional thickness. Conformable, other characteristics are dependent on manufacturer (i. e., wafers, pillows, film covering, adhesive, surfactant impregnated or an odour absorbent charcoal layer.)	Allevyn, PolyMem Lyofoam Tielle Biatain Mepilex	Partial and full thickness wounds; Minimal to heavy exudate; Infected wounds; May be used in combination with other dressing materials (e. g., films, alginates, pastes, powders).	Select a dressing approx. 2-3 cm larger than the wound. Dressing change may be up to 3 times per week. Usual dressing change for foam wound fillers is up to once per day.
HYDROCOLLOID	Absorption limited, promote autolytic debridement	Made of a carbohydrate-based material, they are adhesive, moldable wafers that are impermeable (depending on product) to oxygen, water, and water vapour. Variety of shapes, widths, sizes, contours and thicknesses.	DuoDerm Tegasorb Comfeel	Partial and full thickness wounds, Minimal-moderate exudates. May be used in combination with other dressing materials (e. g., pastes, alginates)	Select a dressing with a minimum of 2-3cm overlap from the margin of the wound. May be cut to conform to difficult areas. Changed up to 3 times a week dependent on exudate levels.

GENERIC CATEGORY	FUNCTION	DESCRIPTION	EXAMPLES	INDICATIONS	USAGE
HYDROGEL	Donates fluid to the wound Promote autolytic debridement	3 forms: flexible sheets with or without adhesive or borders OR amorphous gel delivered from a tube OR impregnated into strip packing materials. Composed of water or glycerin.	Intrasite gel Solosite gel DuoDerm Solugel Purilon	Partial and full-thickness wounds Dry to Minimal exudate. Necrotic wounds, Infected wounds, Used in combination with other dressing materials (e. g., gauze, films)	Sheets without adhesive border or wound fillers are changed up to once per day. Sheets with adhesive covers are changed up to 3 times per week.
CELLULOSE FIBRE GELLING	Absorption; Packing Promote autolytic debridement	Similar to an alginate, this dressing type consists of sodium carboxymethylcellulose (CMC) or Cellulose Ethyl Sulphonate (CES) that interacts with wound exudate to form a gel.	Aquacel Durofiber	Moderate to heavily draining wounds, partial- and full thickness wounds, pressure ulcers (Stages III and IV), surgical wounds, donor sites, dehisced wounds, cavity wounds, and wounds with sinus tracts or tunnels.	Loosely pack into a wound. Dressings may be layered into a deep wound. A secondary dressing is required to secure. Change up to once per day depending on exudate levels.
HYPERTONIC SALINE GAUZE	The hypertonic saline creates an osmotic action to cleanse the wound by wicking away necrotic tissue and purulent debris. The hypertonic properties will inhibit bacterial growth	Cotton or synthetic gauze impregnated with hypertonic saline in either a crystalline (dry) or solution (wet) form.	Curasalt, Mesalt, Hypergel	Full-thickness wounds Infected wounds Wound with cavities or tracts that have slough or necrotic tissue in the base	Loose packing. Monitor for exudate to avoid maceration. Choose appropriate size and ingredients for dressing.
ISLAND DRESSINGS	Absorption (minimal); Secure primary dressings	Combine a primary dressing with an adhesive secondary dressing. The primary dressing is usually a non-adherent, absorbent cotton and/or acrylic layer. The adhesive secondary dressing or outer layer can be permeable, semi-permeable or occlusive in nature.	Primapore Telfa Island OpSite Post-op Mepore Mepore Pro Compose Island	Commonly used on low exuding wounds or wounds healing by primary intention. Partial and shallow full-thickness wounds. Minimal-moderate exudate (dressing dependent and when used in combination with another dressing such as an alginate).	A paper-backing liner is removed and the dressing applied to the wound. Usual composite dressing change is up to 3 times per week, one wound cover per dressing change.

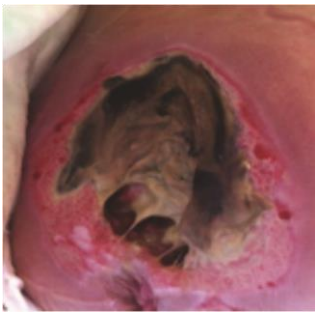
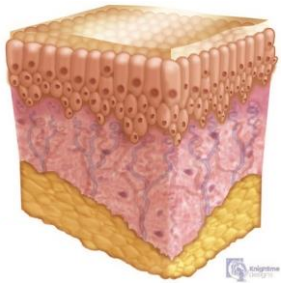
GENERIC CATEGORY	FUNCTION	DESCRIPTION	EXAMPLES	INDICATIONS	USAGE
TRANSPARENT FILM	Protects	Thin, transparent polyurethane adhesive film, semipermeable to air	Op-Site, Tegaderm film	Partial thickness minimally draining or closed wounds.	Allow 4-5 cm overlap from wound margin to the surrounding skin. Dressing may be left undisturbed up to 7 days.
NON-ADHERENT DRY OR FILM COATED DRESSING	Protects	Thin perforated polyester film or non-stick agent, attached or bonded to a cotton and/or acrylic absorbent pad. The non-adherent surface may be single or double sided. Non-adherent dry dressings are frequently used as the contact layer in island dressings	Melolin Melolite Telfa Release Cutilin Premid Lite	Partial and shallow full-thickness wounds. Minimal-heavy exudate (dressing dependent and when used in combination with another dressing such as an alginate).	
SKIN SEALANTS	Provides a transparent barrier of protection over vulnerable skin from the effects of moisture, mechanical or chemical skin injury	Liquid transparent film delivered by a wipe, wand or spray Contains a plasticizing agent such as copolymer; some products contain isopropyl alcohol	Cavilon No Sting Barrier	Protect vulnerable peri-wound skin from wound exudate and moisture.	Apply with each dressing change
Skin Barrier Powders	Absorbs and dries weepy denuded skin to improve the adherence of ointments, pastes and adhesive	Powder Pectin, karaya, gelatine, carboxy methyl cellulose, or combination based products; also used with ostomy care	Stomahesive Protective Powder, Karaya Powder, Premium Powder	Weepy denuded skin before applying ointments, pastes, or adhesive barriers to improve adherence	Use as needed, remove excess after application. Discontinue when the skin is no longer denuded

Appendix Two: Pressure Injury Stages

DEFINITION	SCHEMATIC DRAWING	EXAMPLE
STAGE 1 PRESSURE INJURY **Non-blanchable erythema of intact skin** Intact skin with a localized area of non-blanchable erythema, which may appear differently in darkly pigmented skin. Presence of blanchable erythema or changes in sensation, temperature, or firmness may precede visual changes. Color changes do not include purple or maroon discoloration; these may indicate deep tissue pressure injury.		
STAGE 2 PRESSURE INJURY **Partial-thickness skin loss with exposed dermis** Partial-thickness loss of skin with exposed dermis. The wound bed is viable, pink or red, moist, and may also present as an intact or ruptured serum-filled blister. Adipose (fat) is not visible and deeper tissues are not visible. Granulation tissue, slough and eschar are not present. These injuries commonly result from adverse microclimate and shear in the skin over the pelvis and shear in the heel. This stage should not be used to describe moisture associated skin damage (MASD) including incontinence associated dermatitis (IAD), intertriginous dermatitis (ITD), medical adhesive related skin injury (MARSI), or traumatic wounds (skin tears, burns, abrasions).		
STAGE 3 PRESSURE INJURY **Full-thickness skin loss** Full-thickness loss of skin, in which adipose (fat) is visible in the ulcer and granulation tissue and epibole (rolled wound edges) are often present. Slough and/or eschar may be visible. The depth of tissue damage varies by anatomical location; areas of significant adiposity can develop deep wounds. Undermining and tunneling may occur. Fascia, muscle, tendon, ligament, cartilage or bone are not exposed. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.		
STAGE 4 PRESSURE INJURY **Full-thickness loss of skin and tissue** Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage or bone in the ulcer. Slough and/or eschar may be visible. Epibole (rolled edges), undermining and/or tunneling often occur. Depth varies by anatomical location. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.		

PRESSURE INJURY AND STAGES

A pressure injury is localized damage to the skin and underlying soft tissue usually over a bony prominence or related to a medical or other device. The injury can present as intact skin or an open ulcer and may be painful. The injury occurs as a result of intense pressure, prolonged pressure or pressure in combination with shear. The tolerance of soft tissue for pressure and shear may also be affected by microclimate, nutrition, perfusion, co-morbidities and condition of the soft tissue.

DEFINITION	SCHEMATIC DRAWING	EXAMPLE
UNSTAGEABLE PRESSURE INJURY **Obscured full-thickness skin and tissue loss** Full-thickness skin and tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar. If slough or eschar is removed, a Stage 3 or Stage 4 pressure injury will be revealed. Stable eschar (i.e. dry, adherent, intact without erythema or fluctuance) on an ischemic limb or the heel(s) should not be softened or removed.		
DEEP TISSUE PRESSURE INJURY **Persistent non-blanchable deep red, maroon or purple discoloration** Intact or non-intact skin with localized area of persistent Nonblanchable deep red, maroon, purple discoloration or epidermal separation revealing a dark wound bed or blood-filled blister. Pain and temperature change often precede skin color changes. Discoloration may appear differently in darkly pigmented skin. This injury results from intense and/or prolonged pressure and shear forces at the bone-muscle interface. The wound may evolve rapidly to reveal the actual extent of tissue injury or may resolve without tissue loss. If necrotic tissue, subcutaneous tissue, granulation tissue, fascia, muscle or other underlying structures are visible, this indicates a full thickness pressure injury (Unstageable, Stage 3 or Stage 4). Do not use DTPI to describe vascular, traumatic, neuropathic, or dermatologic conditions.		
MUCOSAL MEMBRANE PRESSURE INJURY Mucosal membrane pressure injury is found on mucous membranes with a history of a medical device in use at the location of the injury. These ulcers cannot be staged.		

9- Suggested Readings

- Avoiding common wound management mistakes | Aged Care Quality and Safety Commission
- Incontinence associated dermatitis and pressure injury | Aged Care Quality and Safety Commission
- Wound Management - Australian College of Care Workers
- Hard to heal wounds EWMA 08 Eng final
- Advances in wound assessment the triangle of wound assessment via this link WUWHS_POSITION DOCUMENT.pdf (coloplast.sg)
- Exudate management Made Easy (see attached pdf)
- The following reading will help to support your understanding of the WBP framework by examining how the elements of time are translated into the practical management for different wound types, each presenting with unique clinical challenges.
- Implementing TIMERS: the race against hard-to-heal wounds (magonlinelibrary.com)

10- References

1. Carville K, 2015, *Wound Care Manual. (7th Ed)* Silver Chain Nursing Association, Osborne Park, WA

2. Bianchi, J., Page, B., & Robertson, S, 2015, Skin integrity in the older person: Assessment & management to optimise skin health: Skin Integrity Focus Group, Scotland

3. Mulligan, K. M., O'Connell, K. A., da Silva, A., Szeto, M. D., Sivesind, T. E., Cowdell, F., ... & Dellavalle, R. P. (2022). From the Cochrane Library: Hygiene and emollient interventions for maintaining skin integrity in older people in hospital and residential care settings. Journal of the American Academy of Dermatology.

4. Wilson, Mary. (2018). CLINICAL REVIEW Skin care for older people living with dementia. Nursing and Residential Care. 20. 151-158. 10.hypergranulatio968/nrec.2018.20.3.151.

5. Gunanayagam P, Iliopoulos J, Ahmad M. Considerations in wound care of patients living with dementia. Br J Nurs. 2022 Nov 10;31(20): S32-S40. doi: 10.12968/bjon.2022.31.20. S32. PMID: 36370394.

6. Alzheimer's Society. Factsheet 512FP. Pressure ulcers (bedsores). 2016. https://tinyurl.com/yc44fcbb (accessed June 2023) Google Scholar

7. Chruscik, A., Kauter, K., Windus, L., Whiteside, E., & Dooley, L. (2021). Fundamentals of anatomy and physiology.

8. Van Tiggelen H et al. 2020. Standardizing the classification of skin tears: validity and reliability testing of the International Skin Tear Advisory Panel Classification System in 44 countries, *British Journal of Dermatology*, 183:1, July, p 146

9. Barchitta M, Maugeri A, Favara G, Magnano San Lio R, Evola G, Agodi A, Basile G. Nutrition and Wound Healing: An Overview Focusing on the Beneficial Effects of Curcumin. Int J Mol Sci. 2019 Mar 5;20(5):1119. doi: 10.3390/ijms20051119. PMID: 30841550; PMCID: PMC6429075.

10. Khalil H, Cullen M, Chambers H, McGrail M. Medications affecting healing: an evidence-based analysis. Int Wound J. 2017 Dec;14(6):1340-1345. doi: 10.1111/iwj.12809. Epub 2017 Sep 25. PMID: 28944576; PMCID: PMC7949850.

11. Coleman K & Nissen L, 2014, Pharmacology in wound management, chapter 11, pp 270, in Wound Management for the Advanced Practitioner, Ed Swanson T, Asimus M and McGuiness B

12. Vuolo J, 2010, Hypergranulation – exploring possible management options, *BJN*, 19 (6), S4-S8

13. Baranoski S, Ayello E, & Langemo D, 2020, Wound assessment, in Wound Care Essentials Practice Principles, 5thEd, Baranoski S, Ayello E, Niezgoda, J & Langemo, D Chapter 6, 102

14. Wounds Australia, 2016, Standards for Wound Management, AWMA, 3rd Ed

15. Bryant RA, Nix DP. 2015. Acute and chronic wounds: current management concepts. Elsevier Health Sciences; Nov 24.

16. Brown, A. (2023). Effective care for patients with chronic wounds: a manager's guide to the TIMERS tool. British Journal of Healthcare Management, 29(7), 198-203.

17. Hollinworth H, Collier M, 2000, Nurses' views about pain and trauma at dressing changes: results of a national survey, *Journal of Wound Care*, 9, 369-73

18. Obagi, Z. A. I. D. A. L., Damiani, G., Grada, A., & Falanga, V. I. N. C. E. N. T. (2019). Principles of wound dressings: a review. Surg Technol Int, 35, 50-57.

19. World Union of Wound Healing Societies (WUWHS), 2007, Principles of best practice: Wound exudate and the role of dressings. A consensus document, London : MEP Ltd available on http://www.woundsinternational.com/media/issues/82/files/content_42.pdf

20. Fernandez, R., Green, H. L., Griffiths, R., Atkinson, R. A., & Ellwood, L. J. (2022). Water for wound cleansing. Cochrane database of systematic reviews, (9).

21. McLain NEM, Moore ZEH, Avsar P. Wound cleansing for treating venous leg ulcers. Cochrane Database of Systematic Reviews 2021, Issue 3. Art. No.: CD011675. DOI: 10.1002/14651858.CD011675.pub2. Accessed 30 June 2023.

22. Rezvani Ghomi, E., Khalili, S., Nouri Khorasani, S., Esmaeely Neisiany, R., & Ramakrishna, S. (2019). Wound dressings: Current advances and future directions. Journal of Applied Polymer Science, 136(27), 47738.

23. Cowin, A. J. (2019). New innovations in wound healing and repair. International Journal of Molecular Sciences, 20(7), 1724.

24. Carville K, Lewin G, Newall N, Haslehurst P, Michael R, Santamaria N & Roberts P, 2007, STAR: a consensus for skin tear classification, *Primary Intention*, 15 (1) Feb,18-28

25. Carville, K., Leslie, G., Osseiran-Moisson, R., Newall, N., & Lewin, G. 2014. The effectiveness of a twice-daily skin-moisturising regimen for reducing the incidence of skin tears. *International wound journal*, *11*(4), 446-453.

26. LeBlanc K, Campbell KE, Wood E, Beeckman D. Best practice recommendations for prevention and management of skin tears in aged skin: an overview. J Wound Ostomy Continence Nurs. 2018;45(6):540–542. https://doi.org/10.1097/WON.0000000000000481, Medline, Google Scholar

27. Beeckman D, Campbell J, Le Blanc K et al. Best practice recommendations for holistic strategies to promote and maintain skin integrity. Wounds International; 28 February 2020. https://tinyurl.com/4evesx65 (accessed 23 October 2022) Google Scholar