

Wound care in a nutshell

G Schellack

Pharmaceutical industry specialist and consultant in clinical research and applied pharmacology
Corresponding author, email: pharmacology.tutor@gmail.com

Wound care is an expansive and multifaceted topic, which has evolved into a highly specialised field of practice within the modern-day healthcare setting. The overall incidence of wounds is high, as might be expected, but the variety, circumstances and challenges that pertain to wound care are just as extensive. The latter fact makes an in-depth discussion of wound care, in an article of limited scope, impossible. Therefore, this article aims to provide a high-level overview only and is meant to serve as a mere introduction to, and basic overview of, this fascinating topic.

Keywords: aseptic technique, wound care, granulating wound, tissue necrosis, wound healing, wound dressings

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Prof Nurs Today 2020;24(1):12-15

Introduction

Patients may seek medical attention for a very wide variety of wounds. The latter may even be the result of medical care itself, as would be the case with elective surgery, where patients are left with surgical wounds with or without the use of additional medical devices. Other commonly seen examples include bite wounds, burn wounds and other forms of traumatic injury, chronic wounds that might be the result of vascular insufficiency or immobility (e.g. leg ulcers, diabetic foot ulcers and pressure ulcers), and wounds that are caused by abnormal growths, such as invasive skin cancer or metastases. This article will, however, focus on the general principles of wound care only.

Wound types and wound anatomy

As mentioned already, there are numerous types of wounds that nurses may encounter in the clinical practice setting.

The main categories that are used to describe the most frequently seen open wound types are depicted in Figure 1.

Figure 2 provides an illustration of the so-called anatomy of a prototypical wound, highlighting the terms that are used to reference the different parts thereof.

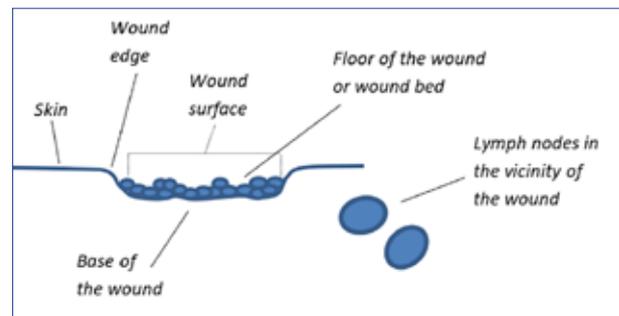


Figure 2: The anatomy of a prototypical wound (adapted and redrawn from Cuschieri et al.)¹



Figure 1: The various open wound types that may be encountered in the clinical practice setting

Wound healing

The process whereby wounded tissues repair themselves is an intricate and highly involved one, which typically progresses through three major phases.² Several authors, however, recognise a fourth distinct phase as well. These phases are:²⁻⁵

- The **inflammatory or exudative phase** (which may also be referred to as the haemostatic phase, depending on the specific circumstances in question): if applicable, a fibrin network and subsequent blood clot forms, and exudate is produced to clean and prepare the injured site for further healing to take place. The injured area may display some of the tell-tale signs of acute inflammation, which do not necessarily point to the presence of an infection. These are: pain at the site of the injury, swelling, redness, the area may feel warm to the touch, and the patient may limit body movements that could have a direct impact on the injury.
- An intermediate phase of so-called destruction, or **resorption**: slough may be present in the wound and point to an accumulation of white blood cells that have been drawn to the site of the injury in an attempt to rid the wound of bacteria and debris, for example. Once these white blood cells have performed their required functions and die off, the area appears to be moist and sticky, with a yellowish-cream colour, indicating the presence of the aforementioned slough.
- The **proliferative or granulation phase**: new tissue is formed, starting out as soft and fragile granulation tissue that typically appears to have a healthy reddish or pinkish colour. The term, granulation, refers to the outgrowth of new blood capillaries and connective tissue cells.
- The phase of **repair, remodelling or maturation**: this phase can last for a full year or more, even up to two years, to fully complete itself and will determine the final and lasting outcome of the wound healing process. This phase includes the formation of scar tissue, which will fade over time, but the healed area will most likely never regain the full functionality it had prior to the injury (depending on the extent and severity of the initial injury).

An initial lesion or wound is caused by the disruption of the normal anatomical and physiological continuity of the tissue area in question. As soon as the wound occurs, the tissue healing, regeneration and repair processes are already set in motion.²

The stages of wound healing do not necessarily need to occur sequentially, and it is very likely that a specific wound may display signs that point to a combination of healing phases being present at any given point in time. For example, a patient may present with an expansive pressure ulcer that displays areas of sloughing, debridement and granulation in different parts of the wound bed.³

Primary versus secondary intention

It is of vital importance for wounds to heal as rapidly and as completely as possible, so as to achieve the best possible outcome for the patient, with an acceptable level of both anatomical and functional integrity. Most wounds will heal by either primary or secondary intention and, in some instances, even via delayed primary intention.^{3,5}

- **Primary intention**: the best examples of wound closure and healing via primary intention may be found in the surgical ward. Patients who underwent elective surgical procedures will usually have had clean or uncontaminated incisions, with well-aligned (*syn.* approximated) wound edges that are being held together by suitable wound closure techniques (e.g. clips, sutures or staples). Such wounds typically display only minimal levels of granulation and scar tissue formation, with the latter fading with time.
- **Secondary intention**: patients with wounds that need to heal via secondary intention are those who have suffered significant tissue damage and loss, such as traumatic avulsions or deep ulcers, for example. In such cases, the edges of the wound cannot be aligned and fastened, meaning that the wound would need to heal via granulation and epithelialisation. This is a much more time-consuming process than healing via primary intention, and ultimately results in more pronounced scarring.
- **Delayed primary intention**: this process may also be referred to as healing via tertiary intention or delayed primary suturing and pertains to wounds that are not sutured or otherwise closed immediately, but rather several days later.

Acute versus chronic wounds

Acute wounds tend to heal in an orderly and timely manner. On the other hand, chronic wounds exhibit delayed or impaired healing. The latter type of wounds may remain in an ongoing state of inflammation, express certain tissue growth inhibitors and be hampered by biofilm formation. The presence of the latter, in particular, may result in a wound that is chronically infected and especially hard to heal.⁶

Wound assessment

Wounds require proper and thorough assessment. This will enable accurate recordkeeping and the effective monitoring of the patient's progress, or lack thereof.

Each wound needs to be assessed in terms of the following:⁶

- The wound type and how it was caused.
- The anatomical location, position, size and relation to other body structures.
- Especially in the case of chronic wounds, how long it has been present already.

- A description in terms of the anatomy of the wound itself, the wound bed, base, edges, surrounding skin, and the nature of any wound exudate that may be present.
- Any signs of wound infection.
- Associated discomfort and pain.
- The presence of factors that may hamper or promote the wound healing process.

Wound exudate should be assessed in terms of the colour, amount or volume, odour and viscosity thereof. The exudate is an important element in the healing process of a healthy wound. The size of a wound should preferably be measured and/or the appearance thereof described in as much detail as possible.⁶

Key indicators of wound infection

A number of factors need to be considered when one assesses a wound for the possible presence of infection, and the signs are not always perfectly clear-cut. In the case of acute wounds, the initial signs that accompany the inflammatory phase of wound healing, may be confused with signs of infection as well.^{2,3,6}

Typically, however, the following factors will point to a potential wound infection and warrant further evaluation and investigation:^{6,7}

- A sudden or worsening bad odour emanating from the wound.
- The presence of a puss-like discharge from the wound.
- Delayed healing or dehiscence.
- Unexpected changes in the appearance of the wound and worsening of the associated levels of pain, tenderness or discomfort being experienced by the patient.
- Wound breakdown or increased ulceration.
- Signs of systemic infection.
- Loss of appetite, the presence of lethargy or malaise, and the loss of effective glycaemic control in patients with diabetes mellitus.

Note that this is not a comprehensive list, but rather a starting point only. Also be aware of the wound infection continuum that is depicted in Figure 3.

Managing wounds in the healthcare setting

Typical wound management in nursing practice usually entails a process of cleansing the wound, followed by the application of a suitable wound dressing, if indicated.



Figure 3: Simplified wound infection continuum (adapted from the International Wound Infection Institute, or IWII)⁷

Wound cleansing

It is widely accepted that the most appropriate technique for the cleansing of contaminated wounds is the so-called aseptic non-touch technique. It is vital for nursing staff to use the most up-to-date guidelines and techniques that are underwritten by their hospital or health service.^{5,6}

Current guidelines dictate the following in terms of cleansing agents to be used:

- Potable (i.e. clean and drinkable) tap water is an appropriate cleansing agent and will not increase the risk of wound infection; it is rarely, if ever, necessary to use an antiseptic solution to clean a wound and such disinfectants are ideally not recommended (distilled, or boiled and cooled water may be used when potable water is not available).
- The frequency and timing of the daily wound cleansing routine should be based on the assessment of the individual patient's needs and requirements.
- Surgical incisions that have been closed under aseptic conditions (e.g. in the operating theatre) should typically not require any further cleansing or disinfection.
- A sterile solution of normal saline 0.9% may be used to gently cleanse or irrigate contaminated wounds, or surgical wounds that are healing via delayed primary or secondary intention.

Wound dressings

There have been numerous advances in the field of wound care, and especially in the development of wound care products and dressings. For the most part, wounds should be allowed to heal in a moist environment. However, this latter aspect, as well as the ideal choice of wound dressing, is dependent upon the outcome of the wound assessment and resultant needs, requirements and preferences of the patient.⁶

Acute wounds that are healing by primary intention usually only require a simple island dressing with low wound adherence properties, which will be left in place for the first 24 to 48 hours (such as Opsite®, Primapore®, Tegaderm®, and other examples). Thereafter, these wounds are generally left uncovered. Chronic wounds, on the other hand, are far more complicated to manage and require more advanced wound care products and dressings.⁶ A thorough review and explanation of these products, however, do not fall within the scope of this article.

Figure 4 provides the key characteristics of an ideal wound dressing and Table 1 comprises an overview of the types of dressings that will typically be encountered in the practice setting.

Table 1: Basic wound dressing choices* for adult patients in a nutshell (with some examples added for illustrative purposes only)^{6,8}

Type of wound (and typical colour)	Objectives of wound management	Wound care and dressing options	Examples
Necrotic wound (black)	<u>Debridement</u> of non-viable tissue	<ul style="list-style-type: none"> Hydrogel Hydrocolloid Enzymatic Wound care specialist 	Alginates: Biatain® Alginate Curasorb®
Sloughing (yellowish cream)	<u>Removal of slough</u> from the wound	<ul style="list-style-type: none"> Hydrogel Hydrocolloid Enzymatic Alginate Capillary-action dressing 	Capillary-action dressings: Drawtex® Dressings with some antimicrobial properties: Allevyn® Ag Biatain® Alginate Ag
Granulating wound (reddish pink)	<u>Protect</u> the fragile granulating tissue and provide a moist healing environment	<ul style="list-style-type: none"> Moisture retentive dressing Hydrocolloid Hydro-fibre Foam 	Enzymatic debridement action: Iruxol® (collagenase ointment)
Epithelialising wound (blueish pink)	<u>Protect</u> the epithelial tissue and provide a moist healing environment	<ul style="list-style-type: none"> Hydrocolloid Film or foam dressing 	Film/occlusive/moisture-retentive dressings: Opsite® Primapore® Tegaderm®
Infected wound (signs of infection, purulent discharge, malodour) ('greenish')	Manage the infection	<ul style="list-style-type: none"> Daily non-occlusive or antimicrobial dressings Foam or alginate with silver (Ag) 	Foam: Allevyn® Aquacel® Biatain® Tielle® Hydrocolloids: Comfeel® Granuflex® Hydro-fibre: Durafiber® Hydrogels: Cutimed® Granugel® Intrasite®

*Note: This table provides a very condensed overview only. There are other strategies (including the use of topical honey)⁸ and many other wound care products that may be considered as well.

Provides a warm, moist, acidic environment at the wound surface
Excludes atmospheric oxygen/air
Impermeable to pathogens
Non-adherent, non-toxic and hypoallergenic
Provides protection and may be left in place for some time

Figure 4: Key characteristics of the ideal wound dressing for the prototypical wound⁵

Conclusion

Modern-day wound care has become highly specialised, as it pertains to extensive, chronic, infected and advanced wounds. Routine wound care, on the other hand, mostly revolves around gentle cleansing and the provisioning of a warm and moist environment, with minimal disruption, for optimal wound healing to take place. This article merely provides an introduction and basic overview, and because of the numerous possibilities and intricacies involved in the management of the wide variety of wounds that nurses may encounter in the clinical practice setting, the reader is

advised to consult more expansive texts and guidelines on this fascinating topic as well.

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