

## Introduction

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In the past, traditional fabric wound dressings were used extensively. Their primary function was considered to be to keep the wound as dry as possible by allowing evaporation of exudate. It was assumed, therefore that dressings were a passive product with only a minor role in the healing process. However, it is now realized that a wound heals faster and more successfully in a moist environment. This has led to a greater understanding of the influence that wound dressings can have on wound healing and greater attention has been given to the design of more effective dressings. Over the last two decades, a large number of new dressings has become available, based on the concept of creating an optimum environment for the treatment of wounds. However, it is emphasized that there is still no single dressing suitable for the management of all types of wounds or for the treatment of a single wound during all phases of healing.

Many of the newer dressings aim to manage chronic wounds that are difficult to treat because wound physiology is altered. Such wounds are often a problem of the elderly and bedridden. Chronic wounds, as well as compromising the quality of life of the patient, place an enormous financial burden on health services.

Some modern dressings are designed to deliver drugs or wound-healing agents directly to the affected site.

Successful design of wound dressings depends on an understanding of the healing process, the patient condition in terms of health, environment and social circumstance, and the effect that the physicochemical properties of the various dressing materials have on the wound-healing process.

## Wounds and wound healing

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### Wounds

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The protective functions of the skin are compromised by injury. A wound can be defined as a defect or a break in the skin, resulting from either mechanical or thermal damage, or as a result of the presence of an underlying medical or physiological condition. Wounds are classified according to the number of skin layers affected and the area of skin involved:

- *superficial wounds* involve injury to the epidermis alone
- *partial-thickness wounds* involve injury to the epidermis and the deeper dermal layers, including the blood vessels, sweat glands and hair follicles
- *full-thickness wounds* occur when the underlying subcutaneous fat or deeper tissues are also damaged.

Wounds are described as *normal (acute)* if they heal rapidly with minimum scarring and *chronic* if they take longer than 8–12 weeks to heal.

Simple mechanical injuries such as cuts, grazes and minor burns are usually treated by the patient, whereas the more severe traumatic injuries caused by, for example, surgery, traffic accidents and fires require hospitalization. Chronic wounds require specialist nursing care. Without an understanding of all these factors, correct dressing selection is not possible; incorrect choice of dressing is potentially ineffective and wasteful in terms of nursing time.

### Wound healing

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Wound healing may be considered as a dynamic process in which cellular and matrix components act together to re-establish the integrity of damaged tissue and replace lost tissue. Regardless of the source or the extent of tissue damage, under normal conditions the wound-healing process occurs in a predictable fashion as four overlapping stages: inflammation, migration, proliferation and maturation (remodelling). Healing is considered to be complete when the skin surface has reformed and has regained its tensile strength.

#### Inflammation

Inflammation is the body's initial response to injury and involves both cellular and vascular responses. The release of histamine and a number of other cell-mediated factors into the wound results in vasodilation, increased capillary permeation and stimulation of pain receptors. The release of a protein-rich exudate containing phagocytes and other materials from the blood capillaries onto the wound surface engulfs the debris of dead cells and bacteria (known as *autolytic debridement*). Fibrinogen in the exudate elicits the clotting mechanism, producing a clot or scab on the wound