



From Wound to Recovery: The Basic Principles of Wound Healing

Lynda Steyn, BPharm
Amayeza Info Services

A wound occurs when the skin is broken exposing the body to germs and possible infection. The skin can be broken through many different mechanisms, e.g. trauma (cuts, scrapes, puncture wounds, burns, surgery and animal bites), or through other factors that may result in previously undamaged skin being broken down, e.g. decreased blood flow to an area of skin leading to pressure sores.

Wound healing occurs as a natural response to injury and involves various phases resulting in restoration of the injured skin. The phases or stages of the healing process occur in an orderly or structured manner, although these phases do overlap.

Wounds may be regarded as acute or chronic and, depending on the cause of the trauma, be classified as simple or complicated.

Acute wounds

- Usually occur as a result of trauma, and the cause is easily identifiable
- Stages of healing have a clear start and endpoint

Chronic wounds

- Generally occur as a result of a wound that is prevented from healing properly
- The stages of healing do not have a clear wound closure endpoint

Understanding the basic principles of how a wound heals and what can affect the healing process helps in recommending the proper management of the wound.

The four stages of wound healing (Figure 1) include:

- Blood clot formation (haemostasis)
- Inflammation
- Proliferation
- Maturation

In general, wounds take about 4–6 weeks to heal. If wound healing is delayed beyond this general timeframe, they are classified as chronic wounds.

Factors that may impair wound healing

Many factors and disease states may prevent or slow the wound healing process. These may include:

Diabetes

Decreased blood flow in the small blood vessels leads to a decrease in oxygen flow to the wound. In addition, there is also a decrease in immune system function, formation of new blood vessel networks, strength of the mature wound and a slower formation of collagen. It is essential for a diabetic to adequately control blood glucose levels in order for proper wound healing to occur.

Smoking

Nicotine causes constriction of blood vessels which delays wound healing. Smoking is also directly toxic to the wound.

Radiation and immunosuppressive drugs

Drugs that suppress the immune system, as well as radiation, lead to a delay in wound contraction and healing.

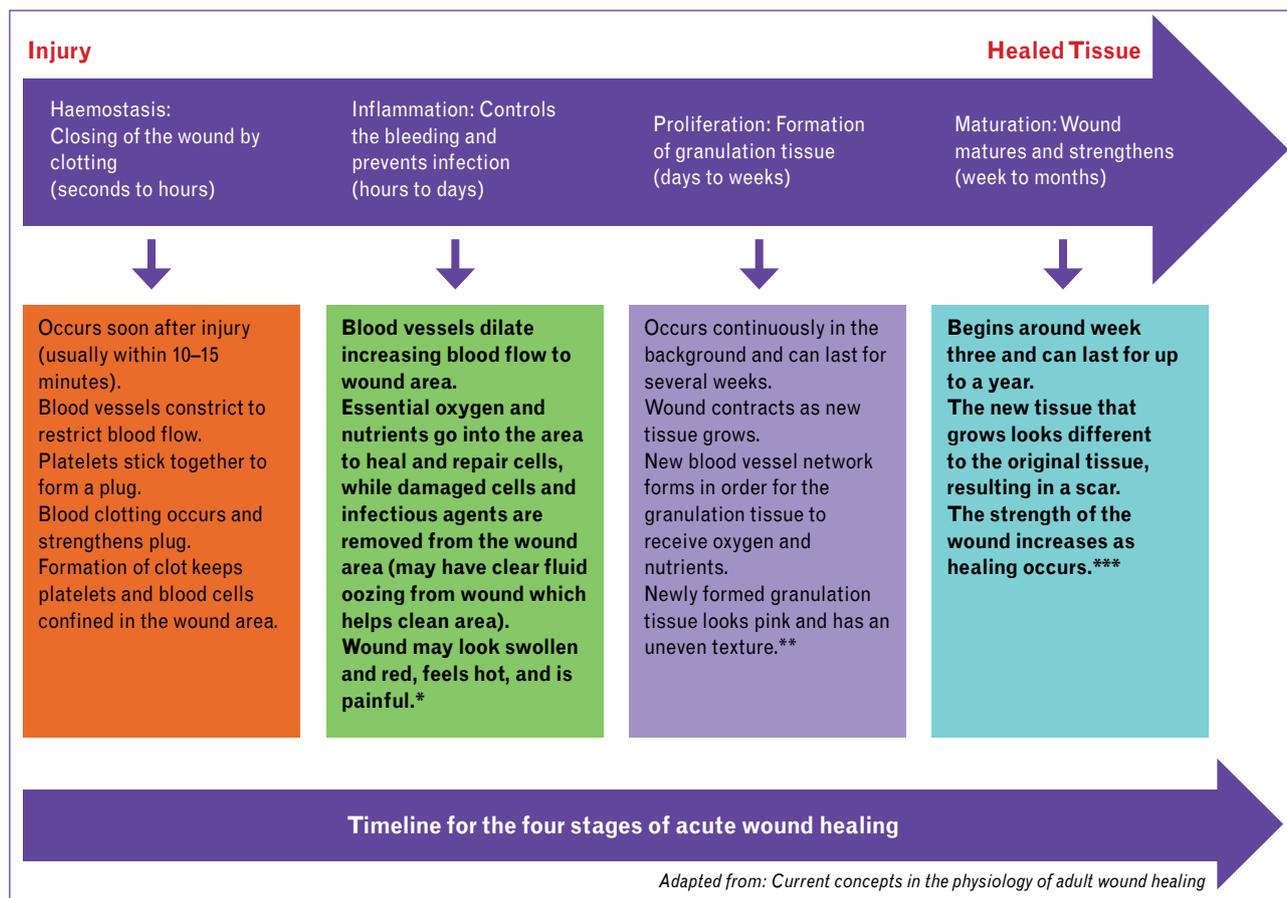


Figure 1. The four stages of wound healing

* Inflammation is a normal part of the healing process, but may become a problem if it is excessive or prolonged.
 ** Dark granulation tissue may indicate infection, or poor blood supply to the wound.
 *** Healed wound areas are generally weaker than the previously uninjured skin

Active wound infection, a decrease in oxygen reaching the tissue (hypoxia), increased age, heavy alcohol use, stress and malnutrition have all been known to interfere with and slow the wound healing process.

Proper wound management recommendations:

- Prevent infection and contamination of wound
- Keep the wound moist, clean and hydrated – this speeds up the healing process
- Choose the correct dressing – dressing should allow for airflow, prevent contamination of the wound and be able to absorb excess fluid from the wound

Each phase/stage of the delicate wound healing overlaps and the process is complex and delicate. If any part of this wound healing process is disrupted, it can delay the proper healing of the wound. Proper wound management can speed up the healing process and prevent a wound from becoming chronic.

Bibliography

1. Wallace HA, Bhimji SS. Wound, Healing, Phases. [Updated 2018 Jul 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2018 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK470443/>
2. Armstrong DG, Meyr AJ. Basic principles of wound healing. In: UptoDate. [updated 26 Jun 2017; cited 30 Jul 2018].
3. WoundSource. The Four Stages of Wound Healing. [updated 28 Apr 2016; cited 30 Jul 2018]. Available from: <https://www.woundsource.com>
4. How wounds heal. MedlinePlus Medical Encyclopedia. [updated 24 May 2016; cited 13 July 2018]. Available from: <https://medlineplus.gov/ency/patientinstructions/000741.htm>
5. Simon PE. Skin Wound Healing. Medscape. [updated 24 May 2018; cited 30 July 2018]. Available from: <https://emedicine.medscape.com/article/884594-overview>
6. Thiruvoth FM, Mohapatra DP, Sivakumar DK, Chittoria RK, Nandhagopal V. Current concepts in the physiology of adult wound healing. *Plast Aesthet Res* 2015;2:250-6. Available from: <http://parjournal.net/article/view/1211>