Peak Development for … Home Health Aides©

Vol 20 Issue 12
December 2019

Skin Changes: Wound Healing—How It Happens

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After reading the newsletter, the home health aide should be able to:

1. Identify important functions of the skin.
2. Describe the structure of normal skin.
3. Discuss three stages of the wound healing process and their functions.
4. Identify factors that can cause impaired wound healing.

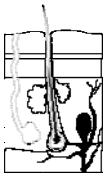
As the largest organ in the human body, the skin performs many functions that are essential for life. It serves as a barrier between the internal body structures and the environment. This provides protection from germs, toxic substances, ultraviolet radiation and injury. Skin plays an important role in regulating body temperature and fluid balance through the use of its sweat glands, hair, and blood vessels, and by keeping fluids inside the body. It reacts with ultraviolet radiation from the sun to make essential vitamin D for the body. And, the skin allows us to feel sensations, such as touch, temperature, pressure and pain through its nerve endings.

When this important organ is injured, its ability to perform the normal protective functions is reduced. This can seriously affect the health of the affected person. Fortunately, for most people, the skin is able to repair itself through the process of wound healing.

This newsletter will discuss wound healing, including the normal structure and function of the skin, types of wounds, and the stages of wound healing. Factors that can impair wound healing will also be discussed.

Structure of Normal Skin

The skin has three main layers, all of which perform specific functions for the body. The first and outermost layer is the epidermis. This is the layer you see when looking at your skin. The epidermis continuously creates new skin cells, which are pushed up to the skin surface and eventually shed. It also contains immune cells that help to prevent infection. The eyelids have the thinnest layer of epidermis, while the palms and soles have the thickest. There are no blood vessels in the epidermis.



The second skin layer is the dermis, made of strong, elastic tissue called collagen. This layer provides structure and support to the skin. It contains blood vessels, nerve endings, hair follicles, oil glands and sweat glands.

Below the dermis is the subcutaneous layer, made of loose connective tissue and fat, along with blood vessels, glands and nerves. This layer provides insulation and padding, and serves as an energy source.

Wounds and Wound Healing

A wound can be defined as an alteration in the normal structure and function of tissue due to injury. Wounds can be intentional, such as a surgical incision. They can also be accidental, due to trauma.

Wounds most commonly arise from forces outside the body, such as cuts, bumps, burns, bites, crush

injuries, shearing and friction. They can also occur from within, such as leg ulcers that develop when blood flow to tissues is poor, causing cell injury and death.

Because of the body's physiologic response to injury, wounds are normally able to heal, with or without medical assistance, unless the person dies as a result of the wounds. When a wound occurs in the skin, the body begins the healing process immediately. Wounds may heal by primary intention, meaning that that wound edges are brought together and closed with methods such as sutures, staples, adhesive or skin grafts. An example is a surgical incision, closed with sutures. When wounds heal by secondary intention, they are left open, and eventually heal themselves by "filling in" the open area with new tissue. This is common treatment for wounds that are contaminated or don't have enough skin to bring together, such as pressure ulcers. Healing by primary intention results in the most rapid healing, with less scarring, compared to secondary intention.

Wound healing occurs in three main stages:

Stage 1- Inflammation: This stage begins at the time of the injury and continues for about 6 days. As soon as an injury occurs that causes bleeding, blood vessels constrict and platelets and other substances begin the clotting process, in order to stop the bleeding. Some wounds do not bleed, however, such as burns, pressure ulcers and some puncture wounds. Then, the immune system sends white blood cells to invade the wound to help fight infection, and these release chemicals to bring in other helper cells. These chemicals cause inflammation of the area, which becomes warm, red and swollen.

Stage 2- Proliferation: In this stage, new tissue is made to fill in the wound. This stage begins three to five days after injury, overlapping with inflammation, and can continue for up to four to six weeks. Special cells called fibroblasts enter the wound to make collagen and other substances, and new blood vessels develop to supply the area with oxygen and nutrients. This new tissue is called granulation tissue.

Stage 3– Tissue Remodeling: In this stage, the collagen matures and the new skin layer is built at the surface of the wound as the scar develops. This stage begins at about three weeks after injury and may last up to one to two years. When wound repair is complete, the strength of the scar is only about 80% of the strength of the skin prior to injury.

The time frames listed for these stages can vary, and apply only to normal wound healing. In some cases, the wound healing process does not occur normally, leading to a chronic wound. This is a wound that heals very slowly, heals and then breaks open again repeatedly, or doesn't heal at all, sometimes for months or years.

Factors Affecting Wound Healing

There are many factors that can affect how quickly and effectively a wound heals. Some of these include:

Oxygenation: The cells responsible for wound repair require oxygen to function properly. Lack of oxygen, due to cardiovascular or respiratory disease, shock or anemia, impairs the wound healing process.

Infection: A wound infection delays normal healing, since the infecting organisms prevent normal wound repair functions and damage the new tissue cells.

Stress: Psychological stress reduces immune function. This causes a decrease in the wound repair process.

Diabetes: Damage to blood vessels and nerves from diabetes impairs wound healing through reduced blood flow, oxygenation and immune response.

Age: As people age, the wound repair process slows down and becomes less effective. This increases the risk of delayed wound healing and chronic wounds.

Nutrition: Effective wound healing requires protein, vitamins, minerals and calories to provide energy and nutrition for proper cell function. Poor nutrition can cause delayed or ineffective wound healing.

Lifestyle factors: Poor lifestyle and health habits, such as obesity, smoking, excessive alcohol use and lack of sleep, can all contribute to faulty or delayed wound healing.

Wound healing is a complex process that can significantly affect the client's health and quality of life. Knowing how normal wound repair occurs and the factors that affect it can help healthcare providers to identify clients at risk for poor wound healing, and take measures to improve these factors.

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Competency Assessment Tool

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NAME:_____ DATE: _____ UNIT: _____

Directions: Place the letter of the one best answer in the space provided.

_____1. Functions of the skin include which of the following?
A. protection from infection and toxins
B. production of vitamin D
C. temperature regulation
D. all of the above

_____2. The outermost layer of the skin is the:
A. endoderm
B. dermis
C. epidermis
D. subcutaneous

_____3. Which of the following skin layers does NOT contain blood vessels?
A. subcutaneous
B. epidermis
C. dermis
D. none of these skin layers contains blood vessels

_____4. The main functions of the subcutaneous layer include which of the following?
A. insulation and energy
B. protection from substances outside the body, such as germs
C. strong, elastic structure and support
D. shedding and replacing of external skin cells

_____5. Bleeding occurs in all wounds that cause damage to the skin.
A. True
B. False

_____6. When wound healing occurs by primary intention, the wound:
A. is left open to “fill in” through natural healing
B. doesn’t have enough skin left to bring together
C. is closed with sutures or other methods
D. is usually contaminated

_____7. The first stage of wound healing is:
A. proliferation
B. remodeling
C. maturation
D. inflammation

_____8. Which of the following happens In the proliferation stage of wound healing?
A. a new skin layer and scar are formed
B. collagen matures over a period of a year
C. bleeding is stopped and white blood cells fight infection
D. new collagen and blood vessels are formed

_____9. When effective wound healing occurs, the scar is as strong as the skin was before the injury.
A. True
B. False

_____10. With increasing age, the wound healing process becomes slower and less effective.
A. True
B. False

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Group Tracking Log

Employee Name	Test Date	Time	Comments	Signature