

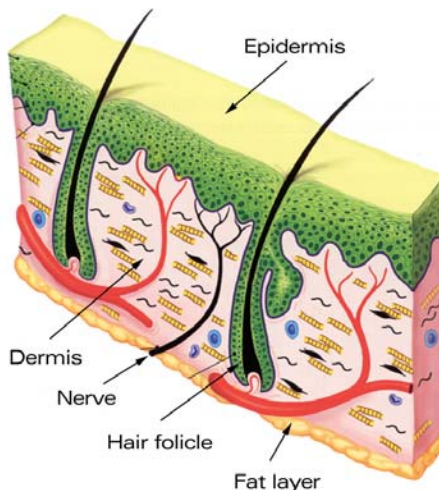
FUNCTIONS OF THE SKIN

- Skin is the largest organ of the body. The average adult has 18 square feet of skin which account for 16% of the total body weight.
- Skin acts as a physical barrier for you to the outside world.
- Skin protects you against infection and injury.
- Skin provides for a water tight barrier. It acts as a barrier for the environment to you, the patient, in everything you do. Lacerations, abrasions or burns alter this ability to protect and buffer you from your surroundings.
- Skin helps regulate body temperature.
- Skin contains glands that lubricate and moisturize your skin.
- Skin undergoes constant repair and regeneration.
- Skin determines your physical identity.

The skin contains a number of appendages which aid in sensation, temperature control and normal skin lubrication or moisturizing. These include the nerve endings which are composed of specialized fibers to facilitate sensation. Different nerve groups are related to specific “sensations”. There are specialized nerves for pain and temperature, proprioception (location), and fine vibratory sensation. There are sweat glands which assist in temperature regulation. Hair follicles are located in the deeper section of the skin and also assist in temperature regulation. Numerous oil glands are located within the skin which assist in moisturizing the skin.

ANATOMY OF THE SKIN

- The epidermis is the thin top layer of the skin.
- The dermis is the thicker under-layer. It contains the sweat glands, hair follicles and nerve endings that feel pain.
- The subcutaneous tissue is the next layer, a fat layer that helps the body to maintain temperature. Underneath the subcutaneous layer is muscle and bone.



WHAT THE SKIN DOES

To better understand the effects of your burn injury, it helps to know the function and anatomy of the skin. The skin, while appearing to be a very thin layer, is actually composed of specialized layers of tissue which perform various functions. It is a very durable and possesses a remarkable ability to heal itself. Yet there are limits to the degree of injury the skin can withstand. In the burn unit we are oftentimes dealing with these limits while trying to help the burn patient recover from their injuries.

Skin is made up of multiple layers of cells that are intimately organized to perform specific functions. In addition to these layers of skin there are deposits of cells which form the building blocks and structural integrity of the skin. They include fibroblasts, keratinocytes, melanocytes, macrophages, and white blood cells. These cells produce collagen, a basic structural building block of skin. They provide for the water tight nature of the skin, add color to the skin help or help fight infection.

Within the layers of the skin are sweat glands, sebaceous (oil) glands, hair follicles, and nerve endings. Below the skin are subcutaneous structures that include adipose (fat) tissue and deeper yet are muscle and bone.

ABOUT BURN WOUNDS

Depth of Injury: The depth of a burn injury depends on the temperature of the burning substance, the duration of contact, and the skin depth in the area burned. This information will help you to recognize the severity of the burn.

First Degree Burn

Damage is to the 1st layer of skin (epidermis). It is pink, red, dry and painful. A good example of this is simple sunburn, as pictured below. If the burn is kept clean it will usually heal over a week or two. Some peeling will occur and there is no scar.



Second Degree Burn

A second degree burn is deeper. This burn may occur from a scald, hot grease or contact with a hot substance such as a curling iron. Depending upon the temperature of the item that the patient came in contact with and how long their skin was in contact with the hot substance determines the extent of the burn. An additional factor to consider is how “thick” a person’s skin is. In the very young and the very old the skin is thinner and will suffer a deeper burn than a thick skinned patient. There is damage to the epidermis (top layer) and some damage to the second layer of skin (dermis). There are blisters (broken or intact). Skin under blister is weepy, pink and painful.

Second degree burns are divided into 2 categories based upon the depth of the burn. There is a superficial second degree burn and a deep second degree burn. (You may also hear us refer to a second degree burn as a partial thickness burn.) The superficial second degree burns typically heal with conservative care (no surgery) in one to three weeks. Typically special burn topical medications are placed on the burn wound. Daily or twice daily wound changes are the norm. New epidermis grows in one to three weeks.

The deeper second degree burn appears more pale than red. The skin is drier and the sensation of that skin tends to be diminished. These are treated in the same fashion describe above, however, sometimes these burns will need operative grafting for eventual repair. Often this decision cannot be made in the first few days and a short course of conservative treatment will be tried.



Third Degree Burn

All layers of the skin are destroyed. Blisters may be present. Color varies (red, pale pink, white, and tan). These burns require skin grafting.

Some partial thickness injuries are deeper than others (referred to as 'deep partial thickness'). Deep partial thickness burns is similar to a third degree burn because more of the structures in the skin is damaged. These types of burns may need to be treated as a third degree burn.



TREATMENT:

1st Degree (Superficial): Moisturizers, over the counter analgesics and /or anti-inflammatory agents, hydration.

2nd Degree (Partial Thickness): Removal of blisters and any other burned tissue and application of creams or ointments. All areas except the face are covered with a gauze bandage. Wound care may be done once or twice a day.

There are a number of topical medications that may be used in care of the second degree burn. Some are topical antibiotics; some are chemical enzymatics that aid in the debridement of the burn wound. Everyday as the wound heals there is a white to yellow eschar (scab) that forms. This must come off as best as possible so that the wound will heal. It can be a long process taking two weeks to resolve.

Xeroform™ (Petroleum gauze) maybe applied and covered with a gauze wrap until it is dry and adherent. It is then left open to air. As the wound heals, the Xeroform is peeled off and the skin is moisturized. Xeroform may be the dressing of choice once the wound has progressed and topical antibiotic creams are discontinued.

TransCyte® is a dressing that is applied to wound and covered with a gauze wrap until adherent. It is then left open to air. As the TransCyte dries and the wound heals beneath it, it is then peeled off and the skin is then moisturized.

3rd Degree (full thickness): These burn wounds need to be operatively treated. First they require the operative removal of the burned skin and underlying structures. This may be followed by the application of a temporary covering, such as donor skin (allograft), or synthetic covering material (Biobrane® or TransCyte®). This permits the underlying structures to stabilize and become prepared for eventual skin grafting (autograft). Autograft requires skin to be taken from somewhere else on the body and placed on the debrided burn wound. If the burn is large it may take multiple surgeries to cover the entire burned area with autograft.

Donor Sites: These are partial thickness and usually heal in about 10-14 days. Usual dressings are Biobrane or Tegaderm™ (a transparent plastic film material) or Xeroform. The Biobrane dressing is wrapped 24 hours postoperatively and then exposed to air. As it dries the skin beneath heals and then the dressing can be peeled off; the skin beneath is then moisturized.

Tegaderm does not require a dressing. Sometimes fluid collects under the Tegaderm; the staff removes the fluid and then patches the hole. It is normal for the Tegaderm to dry as the skin beneath heals.

Xeroform will stay on the donor site for about 7-14 days. A black scab will form on the Xeroform and will begin to loosen. It will be trimmed back as more and more loosens until all of the Xeroform has come off the wound. Sometimes dressings other than the three discussed are used.

Who does the Wound Care? Nurses and Burn Technicians provide the wound care. This involves removing dead tissue and covering the wound with a dressing.

Pain management for wound care: Patients are given medication prior to wound care to help decrease discomfort. However, not all pain can be eliminated. The Burn team will work with you to develop an optimum pain management plan.

Wound care is a delicate and time-consuming process. The amount of time needed for wound care depends on the size of the burned area. The goal is to prevent infection, and to remove dead tissue which will promote healing.

Burn Wounds will change over time and the burn team assesses the wound during a dressing change.

When a staff member assesses the wound they may say "It looks good." This means that the healing is progressing as it should. It may look terrible to you, but keep in mind that as all of these wounds heal; they look different with time.

Scar Formation- Scar severity is dependent upon the level and location of skin destruction and the individual's tendency to scar. Scars will be discussed in detail in a later segment of this book.

Complications: After discharge if the wound becomes red, feels warm, has yellow or greenish drainage, or a bad odor, it is most likely infected. Contact the Burn Center for further instruction.

Skin grafts are delicate and require time to "toughen up". Sometimes there are areas of "graft loss" where either the graft did not develop an adequate blood supply or the wound site sustained some trauma. Some small area graft loss can be considered normal and expected. If the graft loss area is large, further treatment will be necessary.