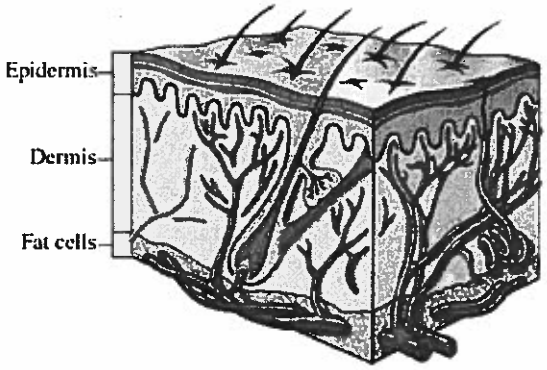
How to Treat Burns

Over 10,000 deaths per year occur as a result of burns. Burns can result from heat, toxic chemicals, and electricity. Always complete a full assessment on the patient as there may be several underlying complications associated with the burn injury itself. The very young and the elderly are at the highest risk for burn injuries, and the lowest rate for recovery. The risk of permanent damage and death from burns increases drastically with smoke inhalation.

Burn Prevention:
Several things can be done to prevent burn injuries. For children, never let the child play with matches or lighters. Do not allow the child near fire places, ovens, stoves, irons, electric cords, or near a bathtub unattended. Water temperature settings should be no higher than 120*F to avoid accidental scolding. Smoke detectors should be installed on every floor of the house. Adults are encouraged not to smoke in bed, to use caution when cooking (splatter), and to keep fire extinguishers in the home at all times.
The elderly have decreased sensations, therefore they may not feel the pain from a burn, and may not smell smoke in a fire. The elderly have the highest mortality rate from burn injuries.

Thermal Burns

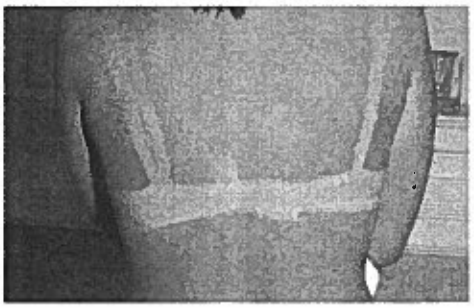


The Epidermis is the top layer of the skin.

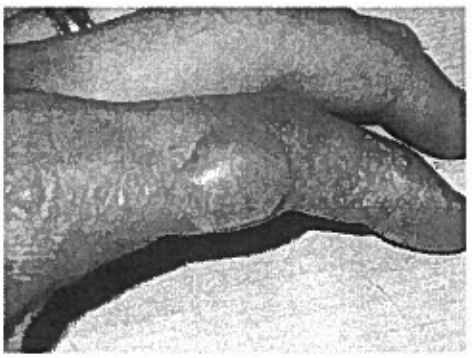
The dermis is the layer below the epidermis and is often referred to as the upper and lower dermis.

Below the dermis are blood vessels, muscle, tendons, ligaments, bone, etc.

Types of Burns:



1. **Superficial First Degree Burns** involve only the epidermis, the top layer of skin. The skin will appear red and dry, and may or may not blister. The patient may complain of tingling and supersensitivity. Although this burn is painful, full recovery from this type of burn usually takes about 1 week and usually will not leave scars. Sunburn is an example of a first degree burn.

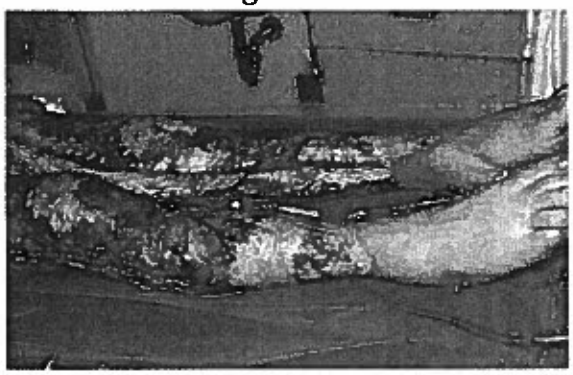


2. **Partial Thickness Second Degree Burns** involve the epidermis and the upper dermis. They do not destroy the full thickness of the skin and the subcutaneous tissue is not injured. The skin color ranges from red to white, and often blisters can be seen. These burns may exude fluid, and are extremely painful. Edema and weeping may be seen. These are extremely painful due to nerve damage in the skin layers. They take 2-4 weeks for full recovery and often they leave minor to moderate scarring.

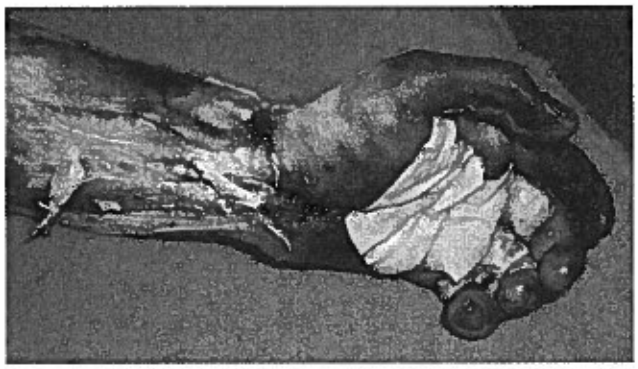
3. **Full Thickness Third/Fourth Degree Burns:** involve the epidermis, upper and lower dermis, and potentially bone, tendons, muscles, etc. The burned area

may be dry and leathery and can range from white, to brown, to black and charred in appearance. The nerve endings are destroyed so this type of burn does not cause pain in the patient; however the surrounding areas that are not burned as severely may cause pain. Many burns are a combination of all the degrees of burns. The difference between third and fourth degree burns is that third degree burns have damage to the dermis and muscle and fourth degree burns damage the muscle, tendons, and may be as deep as the bone.

Third Degree Burn



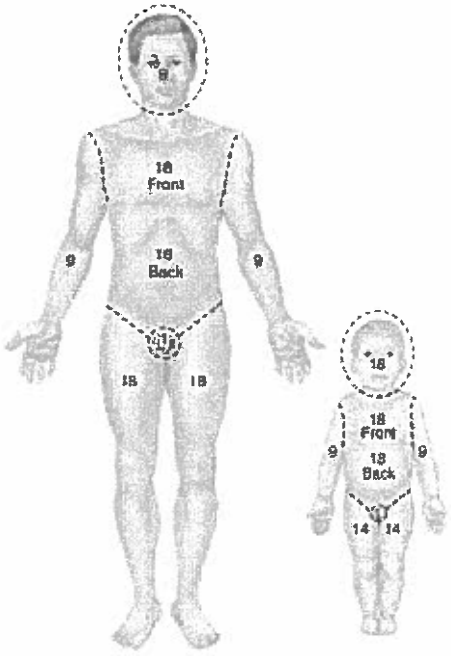
Fourth Degree Burn



Severity of Burns:

1. **Minor Burns:** include full thickness burns less than 2% of the body, partial thickness less than 15% of the body, and superficial burns covering less than 50% of the body.
2. **Moderate Burns:** include full thickness burns up to 10% of the body, partial thickness burns up to 30% of the body, and superficial burns more than 50% of the body.
3. **Critical Burns:** include full thickness burns covering more than 10% of the body and any full thickness burn on the face, hands, feet, genitalia, or circumferential burns. Partial thickness burns covering more than 30% of the body, burns complicated by fractures, and any burn that would be considered moderate if the patient is under 5 or over 55 years of age.

Measuring Burns:



The ***Rule of Nines*** is the most common tool used for measuring burns. This system assigns percentages to body parts to aid in determining how much of the total body surface area (TBSA) is injured. This is a quick method that can be used by EMTs in the prehospital care setting, however it is not the most accurate.

In the adult, the head and arms are each 9% of TBSA. The front of the chest/abdomen, back of chest/abdomen, and each leg is 18% of TBSA. The genitals are 1% of TBSA.

In the child, the percentage given to the head is larger, because the head to body ratio is greater in the child than the adult. The arms are each 9% of TBSA, the front and back are each 18% of TBSA. The legs are a lesser percent than the adult, at 14% TBSA, and the head is a greater percent than the adult, at 18% TBSA.

Assessment of Burns:

The scene size up will remain the same. Though burn injuries can yield dramatic looking wounds, and often involve children, the EMT must stay focused on assessing, treating and transporting the patient. BSI and scene safety are included in the size up. Determine the mechanism of injury (how did the burn occur) and consider spinal immobilization for the patient.

The initial assessment includes the general impression of the patient and determining immediate life threats. Patients who present with singed facial/nasal hairs, and hoarse voices are critical patients that may have an inhalation injury. At this point the EMT should consider the potential for child abuse in burns relating to children. Do ABC's, ensuring a patient airway, giving supplemental oxygen if needed, and ensuring that circulation is adequate. At this point, a decision on transport should be made. ALS should be called for burn patients with moderate or severe burns, and any burn that involves the face. Often superficial first degree burns can go to a local hospital, however if a patient with moderate or severe burns is stable enough, they should be brought to a burn center (Westchester Medical Center).

During the focused history and physical exam the EMT will focus their assessment on the patient's complaints and the affected region for isolated injuries. For patients with electrical burns, remember that spinal immobilization is a must, and heart rate and vital signs should be monitored frequently because electrical burns can cause cardiac dysrhythmias and other problems. DCAP-BTLS should be done, and all wounds should be documented. Baseline vitals and a SAMPLE history should be taken at this time. Interventions will be done (see below) at this point.

Interventions: the goal is to stop the burning process, assess and treat breathing, support circulation, and transport rapidly.

Give oxygen to all burn patients with suspected inhalation injuries. This should be high flow oxygen (over 12lmp) via a non-rebreather mask.

If the patient begins to show signs of hypoperfusion (shock), treat this patient aggressively and rapidly.

Using the rule of nines, determine the percent of TBSA burned, and estimate the degree of the burn.

To stop the burning process, submerge the area in cool, sterile saline (can use an emesis basin or moist gauze/burn sheets). Do not put ice directly on a burn, as it will cause vasoconstriction and further impair blood flow.

All burns should be covered with as close to sterile material as possible. In the prehospital setting, we are unable to keep a sterile field to work in, however burn patients are highly susceptible to infection, therefore you must keep as clean of a workspace as possible. All burn sheets, trauma dressings, saline, and gauze should be treated sterilely. If you drop any of your equipment on the floor or if anything becomes contaminated, you should throw it away and use a new piece of equipment. Burns should be covered with moist, clean dressings, or a burn sheet (if available).

After the patient's wounds are wrapped, cover the patient in a blanket; remember that a major role of the skin is to control body temperature. Once the skin is damaged the patient has trouble maintaining temp.

A detailed physical exam should be performed accordingly.

Perform an ongoing physical exam and document all injuries and treatments appropriately.

Chemical Burns

Chemical burns can occur any tie a toxic substance contacts the body. Most are caused by strong acids or strong bases. To prevent these burns, wear protective equipment. The treatments of these types of burns are generally the same as those of a thermal burn; stop the burning process and remove all trace of chemical from the patient's body. Brush dry chemicals off the skin and clothing before flushing the patient with water. Remove all clothing, jewelry and glasses from the patient, as there may be small traces left. These burns should be flushed for 15-20 minutes after the patient says the burning pain has stopped (do this throughout transport). If the patient has gotten a chemical in their eye, always flush the eye from inner (toward nose) to outer (toward ear); this allows the water and chemical to run away from the nose and mouth.

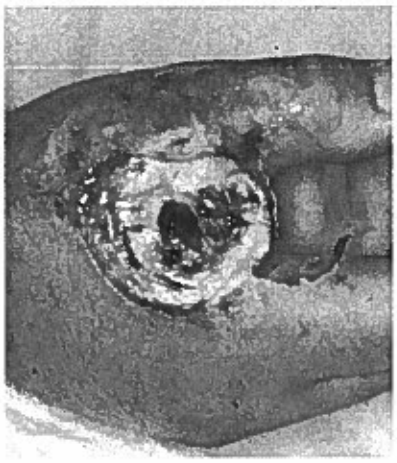
Electrical Burns

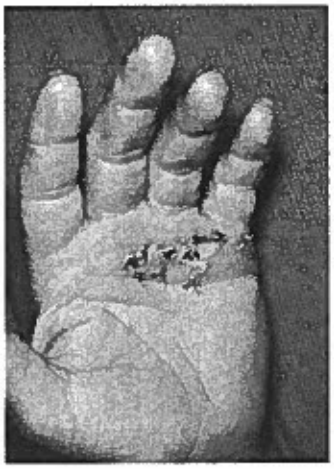
High voltage burns occur most commonly when utility workers come in contact with power lines. Low voltage burns are regular household burns.

For electricity to flow there must be a complete circuit between the source and the ground. Electricity flows through the patient; the human body is a good conductor of electricity because we are mostly water.

You can be fatally injured by contacting a patient who is still in contact with the electrical source

Burn injuries have entrance and exit wounds, similar to gunshot wounds. There will be a small burned area, and the exit wound is often slightly larger and more extensive. Dress these wounds as described in thermal burns.





There may be a large amount of internal damage with electrical burns; therefore the EMT must assess all systems of the body that cannot be seen with great extent. The patient can easily go into cardiac or respiratory arrest as a result of the damage from an electrical burn. CPR with electrical burns has a high success rate if started promptly.

Patients with electrical burns should always have spinal immobilization put in place; simple boarding and collaring (with PMSx4) should be done.

The patient may present with other injuries, but it is important to remember that the priority is the ABC's of the patient. The patient's cardiac and respiratory statuses are the most important.