The assessment and classification of burns must take into consideration a number of factors including percentage of the body surface involved; the depth of the burn and specific tissue involved; and the type of environment within which the individual was exposed to the agent causing the burn. Careful evaluation of the patient's condition must also include assessment of potential endotracheal, pulmonary and circulatory damage if appropriate acute care measures are to be initiated.

The body's response and ability to adjust to changes in temperature helps to dictate the outcome of exposure to burn injuries. Internal body temperature must remain at a relatively constant rate and within a relatively narrow range of change. The external or surface body temperature, on the other hand, can vary to a greater degree because of the body's ability to dissipate the heat. At that point at which the absorption of heat increases at a rate greater than the dissipation of heat, local cell damage begins. Should the increased external temperature significantly increase internal body temperature, death will result.

At temperatures of 44° centigrade there is rarely significant localized tissue damage unless exposure has been over very prolonged periods of time. As the temperature increases the potential for damage significantly increases. Temperatures ranging between 44° and 51° centigrade results in a doubling of the rate of tissue or cell destruction for each degree of increase in temperature. This doubling will occur even when only limited exposure (short periods of time) is involved. At temperatures greater than 51° centigrade, the exposure time necessary for significant cellular damage to take place is extremely brief and the likelihood of escaping such exposure without severe burns is unlikely. Temperatures exceeding 70° centigrade may result in total tissue destruction when even brief periods of exposure are involved.

Classification of Burns

The classification of burn injuries is based on the depth to which the tissue involved has been injured. And the total percentage of the body surface involved in the burns.

In the case of the depth of injury, it has been customary for many years to consider a classification based on three degrees of severity. The nomenclature previously used, (i.e., first, second and third degree burns) has been most recently replaced by new nomenclature known as superficial, partial thickness and full thickness burns.

Superficial burns correspond roughly to the earlier concept of first-degree burns and involve injuries in which only the outer surface or epidermis is involved. Resulting in symptomatology includes tingling, hyperesthesia, some pain, and
Assessment and Classification of Burn Injuries

Some relief of pain by cooling. The burn appears red, may blanch with pressure and may have minimal or no swelling. The skin may peel, but healing typically takes place within a week after superficial or first-degree burns have been encountered.

Partial thickness or second-degree burns involve the epidermis and varying depths of the underlying dermis. Associated acute sequelae include pain, hyperesthesia, and sensitivity to cold air. The wound appears blistered, mottled, and may be draining. Some scarring may result and it is possible for infections within a partial thickness burn to convert the injury to a third degree or full thickness injury. Recovery, if uncomplicated, usually occurs in two to three weeks.

Full thickness or third-degree burns involve the epidermis and the full layer of the dermis as well as possible further involvement of subcutaneous tissue. The injury is painful and the individual involved may experience shock, hematuria and hemolysis of the blood. The burn usually appears charred, pale, white, and dry with broken skin and edema. The course of treatment and duration of treatment are affected both by the actual depth of the burn and the amount of body surface covered. Specific steps taken in initial acute care will be discussed in the next section.

It may be helpful for the rehabilitation counselor involved in working with the burn client to know that most third degree or full thickness burns are the result of fire or prolonged exposure to hot liquids. Partial thickness or second degree burns are usually secondary to a flash flame or scalding while superficial or first degree burns are generally secondary to low intensity, flash flames or sun burn.

In addition to classifying burns on the basis of depth, it is also necessary to classify them in relation to the percentage of the total body surface involved. It is, of course, possible to have a third degree burn involving a very small percentage of the body which is not as nearly life threatening as second degree or partial thickness burns covering a much larger percentage. In assessing percentage of the body surface involved, the Rule of Nine is typically applied in most burn centers. This simply involves dividing the body into multiples of nine to develop a percentage. The head and neck are equal to nine percent of the body surface while the front and back are each equal to eighteen percent. Each arm is equal to nine percent and each leg is equal to eighteen percent of the body surface. Although it is common for physicians to assess the total body surface percentage involved immediately upon initiation of care, it is necessary to have a reevaluation some two to three days post-injury when the line of demarcation is much clearer.

**Other Factors**

In addition to assessing burns from the standpoint of depth and percentage of body surface involved, it is also important for the treating physicians to determine
the cause of the burn and where it occurred (i.e., whether or not the patient was in an open, closed or semi-closed area.) This can help the physicians determine whether or not there has been any inhalation of heat or chemicals, which might result in endotracheal or pulmonary dysfunction.

With respect to causation there are four primary agents involved. They include the following: thermal burns, chemical burns, electrical burns, and irradiation. Thermal burns refer to those secondary to agents such as steam, boiling water, flame, hot water bottles, heated metals, or hot grease. Chemical burns are the result of exposure to acids, caustic soda, strong alkalies, phosphorus and similar chemical agents. Electrical burns are reasonably self-explanatory although they may be varied based on the voltage and amperage involved. Electrical burns may result in systemic changes resulting in disturbances in respiratory, circulatory and central nervous system function.

Irradiation refers to those burns caused by ultraviolet rays, x-rays, and radium. Burns from the latter sources, (x-rays and radium) take quite some time to appear and the more severe outcome such as ulceration may take years to develop.