

## Transcript for Module 2: Introduction to Burn

The second module, I'm going to talk a little bit about burns and their backgrounds, and a little bit about the how to discuss and tease out the nature and epidemiology of these burn injuries.

Now, the first thing to remember is that this is burns all coming, and this is basically a brief epidemiological conversation about what we normally see. Now, in the event of a mass casualty and in essence, these patients may have slightly different backgrounds or situations, but this is just basically an overview and a background a little bit of what burns and we thought we would include it.

So the incident is fairly common. We all know somebody, if ourselves have not been burned at least at some level, but it's around 1.25 million events per year where roughly a half of a million of those patients are sought -- seek treatment. 40,000 of these patients are hospitalized annually, and with right around 3-4,000 of these patients dying from their injuries. Overall, we're pretty good, as the large burns are becoming less and less common due to our building codes and some of our advances in fire safety.

Typically, this a disease or an injury pattern that happens among males in roughly about a 2:1 ratio. It's most common in Caucasians, however the other groups make -- other ethnic groups make up their overall representation in the generalized community. The injury types are most commonly from fire or flame, followed up by scald. Now, these are all comers because as we'll talk about a little bit later that patients of the extremes of age fall into a little bit different area. But overall, fire being the most common. Most commonly, burns -- again, now this would change if this was a mass casualty, but what we see in our daily practice is most of them occur in our homes with kitchen fires and scalds being very, very common.

Again, children and our elderly, vulnerable adults, and children or individuals most commonly are injured by a scald burn for our very young, and our elderly people are most often injured by flames. Again, elderly people usually typically carry a set of medical comorbidities or conditions that make their care a little bit more challenging. I'll make one more point about the very young and very old is that although they may initially be diagnosed with what is considered a second-degree burn or a partial thickness burn, very young children are -- have at that point in their age been unable to develop a thick dermis to resist basically the transformation into a full thickness burn. Likewise, the elderly, although they have had full thickness skin over the course of their life, the thickness or the integrity of their skin has began to fade as we get older, making the more susceptible to converting what we would call a second-degree burn into a third or full thickness burn. Just things to keep in mind when caring for the extremes of age.

Most of the patients that we care for currently, you know, engage in some sort of risk taking behavior. They have impaired responsiveness and in fact, 40% of fire deaths are associated with substance abuse. And so, the joke still pertains that without Y chromosomes in men and alcohol, there wouldn't be a need for very many burn surgeons.

Dr. Mohr: Next, we'll discuss a brief overview of the skin and burn classifications. It's important to remember that the skin protects us from our environment. It protects us from infection and

injury, helps keep temperature and body fluids inside, and it's our interface, our sensory contact with the world. The skin is broken down into a couple of functional units. The epidermis is the water-tight, outer layer that acts like shingles on a house. The dermis provides the flexibility in the skin and the vascularity. It's also where eschar is made.

A burn is defined as an injury to the tissue, usually caused by heat but also by abnormal cold, chemicals, electricity, lightning, or in some cases, poisonous gas. The burn injury can be classified into different zones. The zone of coagulation is an area of complete tissue destruction, the zone of hyperemia is a superficial injury that causes blood vessel dilation, increased capillary permeability, but will heal itself without any residual complications, and the zone of stasis, which is an intermediate level of injury which may or may not heal itself, which may or may not progress to complete tissue destruction. It is this area that the appropriateness of resuscitation is able to make a difference on the amount of tissue that can heal. The four categories of burn depth is the first-degree, second-degree, third-degree, and fourth.

A first-degree burn, which we consider superficial and where we have no loss of our epidermis. We -- it only involves the epidermis, and it is typically related to what we would consider a sunburn. There's no scarring, no disfigurement, and usually fades or heals within a week.

The second-degree of burn is a second-degree burn, or the partial thickness burn. These are made up of both superficial, partial thickness burns and deep partial thickness burns. These burns are made up the entire epidermis and part of the dermis. This is where the epidermis blisters and you have a separation between the epidermis and the dermis. These are typically very painful and if it's only a superficial partial thickness burn or a light second-degree burn, usually these heal via the dermal appendages that we discussed earlier, and they usually heal within two to three weeks. Pigmentation changes are possible, but usually there's minimal scarring. If the burn is deeper into the dermis and has a more difficult time healing and meaning that it is not able to heal from the dermal appendages and requires contraction, that's typically where we would consider skin grafting or talk about the impact of scar.

Third-degree burns, these are the ones that we talk about that require skin grafting. This is basically where all layers of the skin are injured or dead. It has a white, dry appearance, coagulated vessels, and escharing and disfigurement are common. It heals by contracture and it no longer possesses the ability to heal from within, and this is where skin grafting is required.

Fourth degree burns are where we have the underlying structures of the person or the patient involved such as the bones and tendons. Often, this is a charred, disfigured extremity that results in what we would consider extensive disability.