# A Proven Approach to Pre-Hospital Burn Treatment



Product Monograph





Dear Colleague:

Effective pre-hospital burn treatment is a topic that deserves our utmost consideration. Immediate action taken by pre-hospital care providers can make a significant difference in outcome for the burned patient. The goals of pre-hospital burn management are to stop the burning process, cool the burned area, relieve pain, and prevent further injury. Therefore, it is essential that pre-hospital care providers are educated and trained to assess burns accurately and take proper interventional steps, while preparing and transporting the patient to definitive care.

WATER-JEL<sup>®</sup> Sterile Burn Dressings and Blankets are effective, versatile, FDA-approved medical devices for treating burns in the pre-hospital setting. WATER-JEL products are consistent with both wet and dry burn treatment protocols since they stop the burning process and do not contribute to hypothermia or interfere with debridement. There are no active ingredients and the water-soluble gel can be easily washed off at the hospital or burn center. These products represent an important option for pre-hospital burn management.

This monograph summarizes key findings from studies of WATER-JEL as well as information from published articles about the products. The evidence shows WATER-JEL to be safe and effective for treating burns in the pre-hospital setting.

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Mark A. Merlin, D.O. EMT-P, FACEP Chair, NJ MICU Advisory Board Author Burn Chapter: *Caroline's Emergency Care in the Streets* - Paramedic Textbook Medical Director, NJ EMS/Disaster Medicine Fellowship Medical Director, NJ EMS Physician Response Program "MD-1" Medical Director, NJ Regional Paramedic Program



# **EXECUTIVE SUMMARY**

**Over 1 million people in the U.S. are burned each year,** including many children. Cooking and food preparation/cleanup are often the cause since common cooking methods use temperatures of up to 500° F (260°C).

Of the **500,000 burns treated annually** in hospitals, 40,000 are admitted including 25,000 to burn centers. <sup>I</sup> Pre-hospital care providers must stop the burning process, cool the burn, and transport the patient safely to the hospital or burn center.

Water and normal saline have traditionally been utilized by firefighters and emergency medical technicians to treat burns in the pre-hospital environment. Due to the limitations of these materials including availability at the site of the emergency,



rapid evaporation from the burn wound and the possibility of inducing hypothermia,

**gel-coated dressings are gaining prominence with emergency response agencies.** The products, which are portable and ready to use, stop the burning process, cool the burn, and do not cause treatment-induced hypothermia.

WATER-JEL Sterile Burn Dressings and Blankets have been proven safe and effective in clinical studies for the treatment of burns. The product stops the burning process, cools the burn, and does not cause treatment-induced hypothermia. WATER-JEL is the only burn treatment product specified by the Department of Defense for use on white phosphorus burns.



"Immediate action taken by pre-hospital care providers can make a significant difference in outcome for the burned patient."

# BURN TRENDS: THE GOOD NEWS

Despite an encouraging drop in burn injuries reported by the American Burn Association, burns remain among the most dreaded injuries treated by pre-hospital care professionals. Today's estimated annual incidence of just over one million U.S. burn injuries is significantly lower than the two million estimated per year in the National Health Institute Survey from 1957 through 1961.<sup>2</sup>



Burns occur both in the home and workplace, tragically resulting in approximately 4,000 U.S. deaths per year. Burns are the 7th leading cause of injury death.<sup>3</sup> Burn statistics generally include burns from all sources including fire, liquid, chemical, electrical, motor vehicle, and aircraft crashes.

Due to aggressive fire prevention education and inspection efforts, as well as strong industrial safety initiatives, the trend in both fires and burn injuries is downward. It is still essential, however, that burns be treated with immediacy in the pre-hospital setting.

Certain populations such as children and older adults are at a higher risk of burn injury than the general population. In the U.S., burns rank 3rd as a cause of unintentional child injury death. Most burns in children occur in the home and are often caused by scalds or cooking accidents. In 2001, according to the National Fire Protection Association, 99,400 children ages 14 and under were treated in hospital emergency departments for burns.<sup>4</sup>

In fact, children less than five years old are more than twice as likely to die in a residential fire than any other age group in the U.S. population. On average, one child under five dies in a residential fire every day, partly because of their limited ability to assess and react correctly to danger.<sup>5</sup>

Cooking and food preparation/cleanup are often a source of burns. Due to extremely high temperatures, many cooking methods can cause serious burns in less than one second.<sup>6</sup>

Fresh coffee, tea, hot chocolate	160° - 180° F / 71° - 82°C
Electric crock pot/slow cooker	200° F / 93°C
Boiling water	212°F / 100°C
Frying	300°F / 149°C
Baking	400°F / 204°C
Deep frying	500°F / 260°C

Risk Factors	Causes of Adult	Causes of Children's	
for Burns	Burn Injuries	Burn Injuries	
<ul> <li>Adults over 65 years of age</li> <li>Children under 14 years of age</li> <li>Group or assisted living facilities</li> <li>Alcohol or drug abuse</li> <li>Medication side effects resulting in confusion</li> <li>Poverty</li> </ul>	<ul> <li>Explosion and flame</li> <li>Scalding oil and/or water</li> <li>Scalding oil and/or water</li> <li>Contact with hot object</li> <li>Electrical 5%</li> <li>Chemical 3%</li> <li>Friction 2%</li> <li>Sunburn 1%</li> </ul>	<ul> <li>Scalds 60%</li> <li>Flame 25%</li> <li>Contact with hot object 10%</li> <li>Electrical 2%</li> <li>Chemical 2%</li> <li>Sunburn 1%</li> </ul>	

# Historical Methods of Burn Treatment

Historically, people have tried many methods to relieve pain and help heal burns. For example, oils from animal fats were used on burns in ancient Greece. Wrapping the burn held the oil next to the tissue but did not allow heat to escape. In Roman times, ashes were often mixed with the oils and herbs were added before wrapping. In the middle ages, wax was used to cover the burn and seal the herbs onto the wound. In the 1800s, ice was used, when available, to rapidly cool burned tissue. By the early 1900s, tannic acid and other desiccating agents were used to dry burn wounds. It wasn't until the 1950s that topical antibiotics were widely available and adopted to prevent and cure burn wound infections. Since the 1960s, rapid wound closure by surgical intervention, skin grafting, and skin substitutes have been employed for healing serious burns. The swift evolution of the EMS system since the 1970s and the increasing level of sophistication in pre-hospital care have led to the development and acceptance of effective gel-coated dressings for burn treatment in the field.

## The Mechanics of Burn Injury

A burn is tissue injury caused by excessive exposure to heat, flame, chemicals, electricity, or radioactivity. Burns can be classified as superficial, partial, or full thickness, depending on the amount of destruction. Burn depth is dependent on temperature, contact time with the heat source, and the delivery medium (wet or dry). Burn severity varies with many factors including duration of exposure, condition of victim's skin, intensity of the agent, and areas of the body involved. Burn effects can be both local and systemic.

Superficial burns can result when human skin is heated to  $104^{\circ}$  F ( $40^{\circ}$ C) or greater. At  $111^{\circ}$  F ( $44^{\circ}$ C), skin tissue can no longer tolerate the heat insult and cell protein begins to denature. This heat injury will progress in extension and depth penetration with wet heat traveling more rapidly into tissue than dry heat. Temperatures over  $140^{\circ}$ F ( $60^{\circ}$ C) can result in vessel thrombosis and immediate cell death. See Figure 1.



At the site of burned tissue, toxic mediators are quickly activated by the body's innate immune response. Excess mediators such as oxidants and proteases cause skin cell and capillary damage.

Vasodilation allows increased blood flow while structural changes in the microvasculature permit plasma proteins and leukocytes to leave the circulation. Increased vascular permeability leads to the escape of fluid into the extravascular space, resulting in leakage from the wound site and leading to electrolyte imbalances. Consequently, burns can result in shock and are a factor in the development of sepsis since

micro-organisms flourish in the hypoprofused and disturbed tissue environment. Infection is a dangerous and common complication of serious burns, often leading to death.

# **Estimating Burn Injuries** in the Pre-hospital Environment

In the 40,000 burns treated each year in hospitals, one third exceed 10% Total Body Surface Area (TBSA) and 10% exceed 30% TBSA burned. About 60% of these are referred to burn centers. Depth of skin layer is crucial in burn progression.<sup>7</sup> In general, the thinner the skin, the deeper the burn.

### The American Burn Association and American College of Surgeons have identified the following types of burn injuries that usually require referral to a burn center:<sup>8</sup>

- I. Partial thickness and full thickness burns greater than 10% of the total body surface area (TBSA) in patients under 10 years or over 50 years of age
- 2. Partial thickness and full thickness burns greater than 20% TBSA in other age groups
- 3. Partial thickness and full thickness burns involving the face, eyes, ears, hands, feet, genitalia, or perineum
- 4. Full thickness burns greater than 5% TBSA in any age group
- 5. Electrical burns, including lightning injury - significant volumes of tissue beneath the surface may be injured and result in acute renal failure and other complications
- 6. Significant chemical burns

- **7.** Inhalation injury
- 8. Burn injury in patients with pre-existing illness that could complicate management, prolong recovery, or affect mortality
- 9. Any burn patient in whom concomitant trauma poses an increased risk to morbidity or mortality, may be treated initially in a trauma center until stable before transfer to a burn center
- **IO.** Children with burns seen in hospitals without qualified personnel or equipment for their care should be transferred to a burn center with these capabilities
- **II.** Burn injury in patients who will require special social and emotional support including cases of child abuse and neglect



## **Rule of Nines**

Burns are traditionally calculated by the Rule of Nines and/or the Lund/Browder method, each of which assigns a relative percentage to distinct body areas for calculating TBSA burned. Generally, the victim's palmar surface is deemed to be 1% of TBSA. Children differ from adults in percentages assigned due to anatomical differences.



#### **Stages of Burn Injury**

Superficial Burn	Skin is red, hot to touch, no blisters present	Painful Epidermal involvement
Partial thickness Burn Superficial	Skin is blistered, often wet.	Very painful. Dermal involvement, but will regenerate.
Deep	Skin is mixed red and/or waxy white, marked edema may develop.	Superficial pain is absent but pressure sensation is present. Healing will occur with scarring.
Full Thickness	Skin and underlying issue are involved, tissue may be charred or white.	Not painful but surrounding areas of superficial and partial burns will be painful. Destroyed areas will not regenerate.

Burns are classified as superficial, partial thickness, and full thickness. Mixed stages of burn injury are commonly found on a single patient. It must be recognized that burns are an evolving injury in which the zones of destruction can increase until the process is stopped by lowering the burn temperature. In a serious burn, three zones are described:

Coagulation - the zone of necrosis - irreversible damage
 Stasis - deep and peripheral to the coagulation zone - cells are viable but can be further damaged - inflammatory response here is responsible for burn edema and shock
 Hyperemia - peripheral to and below the zone of stasis - minimal cell injury - vasodilation present - complete recovery expected if no further problems such as infection occur

In the pre-hospital environment, **early and efficient treatment will halt the further development of the zones**, thereby salvaging a higher amount of viable tissue for definitive care at a hospital or burn center.

While water is an effective medium for cooling burned tissue, its use has limitations. Water stops the burning process, transfers heat through evaporation and begins to lower the surface temperature of the burn. However, heat emanating from deep within the



burn, whether superficial, partial, or full thickness, rises to counteract the cooling effect of the evaporating water, requiring new application. Few ambulances carry enough water to adequately cool a burn. On critical areas such as the face, water is difficult to hold in place. Ice is never used to treat burns because of the additional tissue injury that can result from extreme cold.

For the pre-hospital professional, it is essential to remember that burns evolve over the course of assessment and treatment. Burned tissue will continue to develop until tissue temperature falls and remains below  $104^{\circ}$  F ( $40^{\circ}$ C). Cooling the burn also produces an analgesic effect based on interrupting the release of pain mediators such as thromboxane, prostaglandins, and leukotrienes.<sup>9</sup> **Therefore, it is essential to ensure that the burning process is completely stopped and the cooling of burned tissue begins as soon as possible.** 

In superficial and partial thickness burns, pain is generated from exposed nerve endings still capable of transmitting pain, light touch, and temperature. In full thickness and deep partial thickness burns, these nerve endings may be destroyed, but superficial burns in the same area will still be painful. In deep partial thickness burns, sensitivity to deep touch remains.

# WATER-JEL Proven in Clinical Studies

WATER-JEL Sterile Burn Dressings and Blankets contain a water-based, water-soluble gel designed to draw the heat out of a burn. The product's non-adherent sterile polyester carrier traps the gel and holds it in place over the burn site. WATER-JEL Sterile Burn Dressings and Blankets cool the skin, relieve pain, and protect the burn against evaporation and airborne contamination. WATER-JEL is primarily composed of deionized water, thickened to help it stay in place, and a small amount of Tea Tree Oil, a natural bacteriostatic. WATER-JEL Sterile Burn Dressings and Blankets have NO active ingredients and contain NO lidocaine. Ingredients are listed on the package along with a Total Body Surface Area (TBSA) guide for adults and children according to the size of the dressing. WATER-JEL Sterile Burn Dressings, Blankets and gel are safe in the eyes and mucous membranes. The product can be accidentally ingested without harm. The product has FDA approval as a Class I medical device and bears a 5 year shelf-life.

WATER-JEL Sterile Burn Dressings and Blankets provide controlled cooling of the burn site by acting as a heat exchanger. The heat energy is spread over the whole gel surface because the material conforms to the uneven burn surface. At the outer surface of the gel, the heat is released by transfer into the air. The buffer effect of the WATER-JEL layer leads to rapid heat transfer out of the burn wound without losing temperature around the area of usage.<sup>10</sup> See Figure 2.



Figure 2

As the burn temperature drops, the convection rate of heat to air decreases until the burned area and gel are equal. This gentle and controlled method of cooling helps prevent vasoconstriction, maximizing heat dissipation and preventing burn spread. Due to its ability to control cooling, the use of WATER-JEL Sterile Burn Dressings or Blankets **does not contribute to hypothermia.**<sup>11</sup>

### WATER-JEL Burn Dressing Ingredients:

Ingredient	Purpose
Purified water	Base
Xanthum gum	Thickener, controls viscosity
Glycerin	Humectant, adds moisture
Propylene glycol	Preservative
Melaleuca alternifolia	Antimicrobial Tea Tree oil
Diazolidinyl urea	Preservative
Edetate disodium	Preservative
Methylparaben	Preservative
Octoxynol 9	Surfactant
Propylparaben	Preservative

## Clinical Studies: Second Degree Burn Healing

Controlled burn wound cooling is important in stopping burn progression. A study conducted at the University of Miami School of Medicine assessed partial thickness burn wound treatment with WATER-JEL.<sup>12</sup> The investigators examined the use of WATER-JEL in reducing the temperature of burn wounds applied at differing time intervals.<sup>13</sup> That study found that tissue temperature declined sharply when WATER-JEL was applied and a thinner band of coagulative necrosis was observed when compared to air-exposed or gauze treated burns. See Figure 3.

#### Figure 3



A second study was performed to substantiate the reduction in temperature and examine any possible indication of hypothermia. The mean temperatures of both studies were combined and a curve generated from the data.

The data show that applying the dressing immediately after burning prevented the temperature from reaching its peak. Assessment after one hour showed that the temperature had leveled off and that there was no significant decline in core body temperature. See Figure 4.

The authors concluded that WATER-JEL treatment reduced the temperature of the burn without significantly reducing core body temperature. The data suggest that the subject animals were not at risk for hypothermia following WATER-JEL treatment. The authors believe that the ability of the dressing to reduce burn wound temperature may reduce the progression of burn injury. The authors also postulated that WATER-JEL treatment might stimulate epithelization of partial thickness burns.

**Figure 4** 



## STUDY TITLE: WATER-JEL System on Specific Bacterial and Yeast Strains in Laboratory Conditions

WATER-JEL Sterile Burn Dressings contain oil of Melaleuca alternifolia, a natural oil with bactericidal properties. An extensive bacteriological laboratory evaluation of WATER-JEL dressings conducted at the Ostrava Burn Unit in Ostrava, Czech Republic showed quite clearly its excellent antimicrobial and antimycotic properties for 13 out of 15 strains of microorganisms tested.<sup>14</sup>

The evaluation of WATER-JEL activity was performed using bacterial and yeast strains isolated in the Burn Unit and in the Traumatological Unit of the Department of Surgery at the Medical School Hospital in Ostrava, Czech Republic. The density of bacteria and yeast in the samples exceeded by several times the numbers of bacteria in massively colonized tissues found in patients at the facility. The authors concluded that WATER-JEL can significantly decrease the colonization of wound and burned surfaces within the first few hours after its application.

The same authors, in a preliminary study, used WATER-JEL on 74 burned patients for 24 to 48 hours with superficial partial and deep partial thickness burns. In 89% of the patients, there were no signs of infection on the burn wounds. WATER-JEL treatment was well tolerated with no allergic reactions observed.

## STUDY TITLE: Monitoring of Temperature While Cooling Burn Injuries

The issue of hypothermia induced by the application of water or saline-soaked burn dressings is a serious and common concern that has been much debated. In two separate studies, WATER-JEL Blankets and Sterile Burn Dressings were shown to not cause treatment-induced hypothermia. A study to examine the relationship between established means of cooling and hypothermia was conducted on healthy volunteers.<sup>15</sup> Measurements of core body temperature by ear (tympanic membrane thermometry) were taken during tests measuring: cooling of one extremity either arm or leg, and cooling of both lower extremities from leg to midriff. All water was at  $59^{\circ}$  and  $68^{\circ}$  F ( $15^{\circ}$  and  $20^{\circ}$  C) in ambient room temperature of constant  $68^{\circ}$  F ( $20^{\circ}$  C).

However, when volunteers were cooled with water from leg to midriff, relevant lowering of temperatures was observed. This test demonstrated that cold water alone, applied to both lower extremities to midriff for over 20 minutes, triggered hypothermia in all volunteers. See Figure 5.

Identical test conditions were then repeated using WATER-JEL Blankets, covering the volunteers' both lower extremities to the midriff. It was noted that skin temperature was effectively reduced when the WATER-JEL Blanket was applied but there was no apparent clinical lowering of body temperature during the cooling or post-cooling phases. See Figure 6. Note: Core body temperature dropped when water only was applied. See Figure 7.



The author concluded that the application of gel blankets in the treatment of burn wounds offers substantial advantages when compared to cooling with cold water.

(94.1°F) 34.5

0 8 16 24

32 40 48 56 64 72

Time (min)

80 88

## **STUDY TITLE:** The Effect of a Commercially Available Burn Cooling Blanket on Core Temperatures in Volunteers

In an effort to discover if full body cooling with a burn cooling blanket would cause hypothermia, a prospective, non-comparative, interventional study was conducted on 10 healthy adult volunteers. Subjects were completely unclothed and the entire body, excluding the head, was circumferentially wrapped with a commercially available gel-soaked cooling blanket\* at room temperature. Core body temperature was assessed by rectal probe with continuous monitoring over 30 minutes. There was no significant change in core body temperatures over time (95% CI).<sup>16</sup>

The authors concluded that covering healthy volunteers with a room-temperature burn cooling blanket for 30 minutes does not result in hypothermia, and the cooling blanket reduces water loss.

\* supplied by WATER-JEL Technologies, Carlstadt, NJ, USA

### July 7, 2005... Subway Bombings; London, England



## One of the most memorable images from the July 7, 2005 terrorist bombing attack on the London Underground was a young woman wearing a white

**face mask** being assisted to a triage area. The mask was a WATER-JEL Sterile Burn Dressing specially designed for facial use. These dressings were dispensed by London EMS Managers to volunteers helping with evacuation and treatment at the scene.

The WATER-JEL Face Mask measures 12"x 16", with pre-slit flaps for optimum access to the eyes and nose, as well as an "H-shaped" indented flap for oral access and airway management. The special dimensions of the face mask ensure that the care of a facial burn extends as far as the ears, which are made of cartilage and can be seriously damaged by high temperatures. The WATER-JEL Face Mask also extends well over the chin to accommodate potential burns to the neck.

Bob Fellows, Education Development Manager, London Ambulance Service NHS Trust, said: "In addition to our own Paramedic teams treating the injuries, I also gave WATER-JEL dressings to volunteers and first-aiders who were helping treat the walking wounded in Marks & Spencer. It was one of these face dressings that was applied to a female patient who was photographed as she was being escorted across the road to the Hilton Metropole Hotel for subsequent transportation to St. Mary's Hospital ER. As with the Paddington rail crash in London in 1999, the availability of WATER-JEL was invaluable in this multi-casualty situation." (At Ladbroke Grove, West London, at 8:11 a.m. on October 5, 1999, a First Great Western inter-city train collided with a Thames Trains local service. Police officers and relief workers rushed to the scene, but a fireball swept through the carriages, killing 31 passengers and injuring more than 400.)

#### WATER-JEL Saves Victim in Electrical Accident at Nuclear Power Plant



When 3 employees of the Indian Point No. 3 Nuclear Power Plant in Buchanan, NY were burned, WATER-JEL made the difference. An electrical arc caused an explosion and flash fire within a 6,900-volt switchgear cubicle seriously burning 2 technicians and another worker. On arrival of the plant's EMTs, the most seriously burned worker was found unresponsive; estimated to have 3rd degree burns over 90% of his body.

Dry burn sheets had been applied but scorched and then ignited on the patient's body.

A WATER-JEL Fire Blanket was then applied and the treating EMT immediately noticed a change in the patient's condition.

The patient regained consciousness and later recalled the WATER-JEL Fire Blanket being applied. Steve Van Buren, Fire Protection Supervisor at the plant commented: "In my opinion, the use of the WATER-JEL Fire Blanket was directly responsible for saving the life of technician #1."<sup>17</sup>

### WATER-JEL Sterile Burn Dressings and Blankets in Today's High-Tech Military

White phosphorus, a combustible solid found in many ammunitions and explosives, can produce devastating burns, frequently full thickness, due to the rapid ignition and high lipophilic properties of the compound. When detonated, white phosphorus ejects particles that ignite spontaneously on contact with air, producing a bright yellow flame. Phosphorus continues to burn and can cause tissue destruction as long as it is exposed to oxygen or until it has been entirely consumed. White phosphorus in a burn flushed with water will reignite if allowed to dry out, making it extremely dangerous to victims and rescuers.



WATER-JEL Sterile Burn Dressings and Blankets<sup>\*</sup>, due to their ability to cover a burn and keep it moist for long periods, are the only burn treatment products specified by the Department of Defense for use on its military fighting vehicles and naval service combatant vessels. In addition, the products are specified for field medic and individual soldier first aid kits.

\* Product test by IIT Research Institute Project #: C08066

# Frequently Asked Questions

about WATER-JEL Sterile Burn Dressings or Blankets

## Will WATER-JEL cause hypothermia?

Immediate care of the burn patient includes putting out the fire and cooling the burn. Water and saline cool by evaporation. It is evaporation that can lead to hypothermia and burn shock. Patients with very extensive burns, over half the body, must be carefully managed for temperature control whether treated with water, saline, dry dressings or WATER-JEL because the patient's thermoregulatory system will already be compromised.

However, as the Castner study<sup>18</sup> shows, since WATER-JEL cools by heat transfer and is extremely slow to evaporate, WATER-JEL has been shown to not cause treatment-induced hypothermia.

# Are there any WATER-JEL products designed for specific body areas?

WATER-JEL Sterile Burn Dressings come in several sizes as well as two uniquely shaped dressings specifically for hand and facial burns. WATER-JEL Sterile Burn Dressing for Hand Burns is 8" x 20" and is structured to wrap the hand to avoid finger-webbing, while cooling it and protecting it from contamination. It allows pre-hospital care providers to treat and transport the hand, wrapped in position of function, and is useful for both adult and pediatric patients.

The WATER-JEL Face Mask measures 12" x 16," with pre-slit flaps for optimum access to the eyes and nose, as well as an "H-shaped" indented flap for oral access and airway management.



## Do WATER-JEL products have expiration dates and what if the product has passed its expiration date?

To ensure the high quality of WATER-JEL products, they have undergone stability testing. The expiration date indicates that the product -if not opened - will be stable and effective until that date. WATER-JEL Fire Blankets and Sterile Burn Dressings have a five (5) year shelf life. The expiration date is located on the package near the lot number. WATER-JEL ingredients are also listed on the dressing package.

If a WATER-JEL product has expired, it should be discarded or used for training purposes and replaced. The gel, since it is non-toxic, can be disposed of in regular trash. No special handling is required.



## Frequently Asked Questions (continued)

# Will WATER-JEL interfere with the later use of autograft?

WATER-JEL is totally water soluble and will be removed in the washing process at the Emergency Department or Burn Center. WATER-JEL does NOT interfere with autograft.

# Can WATER-JEL be used on chemical as well as thermal burns?

Yes, but they must be handled differently.

The first principle in treating a thermal burn is to put out the fire, stop the burning process and cool the burn wound. If the victim is unconscious, the presence of a pulse and control of the airway should be established immediately. A WATER-JEL Sterile Burn



Dressing or Blanket puts out the fire and cools the burn on skin or through clothing. Patients may be transported in the WATER-JEL Blanket. Place a blanket, sheet or thermal covering on the patient over the WATER-JEL Blanket during transport, particularly in a colder environment.

The first principle in chemical burns is to remove the chemical agent. Refer to MSDS sheets if available. Follow local protocols and flush with water as indicated after brushing away any dry powder that may be present. No attempt should be made to neutralize the chemical. Clothing must be removed according to protocol since it can serve as a reservoir for the chemical. Once the chemical burn has been controlled, WATER-JEL can be used to provide burn wound protection and pain relief.

"Immediate care of the burn patient includes putting out the fire and cooling the burn."

# TESTIMONIALS

#### Read What People Are Saying About WATER-JEL Sterile Burn Dressings & Blankets

#### Richard Coates MIFireE, FCMI, AIFC Former Municipal Chief Fire Officer UK; World-wide Group Fire Advsior BP International.

I have personally witnessed the instant cooling properties of Water-Jel in the oil fields of Colombia when three persons were burned during a flare surge, the young doctor stabilized all the burns with Water-Jel... all 3 men made a complete recovery.

Water-Jel is a 'must have' in any first aid kit that I take to third world and developing countries where water contamination is the norm and specialist burn treatment centres are few and far between... Turkey, Tanzania, Nigeria, Mozambique, Azerbaijan, Zambia, Algeria are just some of the countries where I have provided Water-Jel to selected fire services and petrochemical facilities and where it has been used by non-medical personnel after a minimum of training.

#### Nancy Caroline, M.D. Author: Emergency Care in the Streets

... you were kind enough to send me some samples of Water-Jel dressings for me to evaluate. I did so, was favourably impressed, and as a consequence, included an endorsement of the product in my textbooks.

Last March, a two-and-a-half year old child here in Northern Galilee, the son of newly arrived Russian immigrants, fell into a bathtub of near boiling water and sustained second degree burns over 80-90% of his body and face. Since I still had a few Water-Jel dressings left from the package you sent me, I radioed the ambulance and told them I would meet them at the helicopter landing pad. We reached the pad at about the same time, and I used all the Water-Jel dressings I had left to cover most of the crucial areas (the baby's face, hands, feet, genitals, and whatever else we could manage to cover with the remaining dressings).

The baby's photograph appeared in the newspaper a few weeks later, over the headlines: "The Doctors Said A Miracle Occurred Here". The article goes on to express the wonderment of the medical staff at Rambam Hospital that the burns did not progress and lead to permanent disfigurement.

#### AJ. Hayward, RAN, LCDR Royal Australian Navy

This is to certify that the RAN uses Water-Jel dressings onboard all our ships and it has been included in the reference as our burn dressings of preference.



#### Thomas J. Breuers, Chief, New York City Department of Health Police

On Tuesday, September 11, 2001, personnel from the Carlstadt Police Department arrived at the 125 Worth Street Department of Health command center bearing a large supply of burn blankets donated by your firm.

These blankets were subsequently distributed to both our triage location and the "Fountain" triage location, where they were utilized by the available Medical staffs to treat substantial numbers of injured. I would like to express the gratitude of the DOH Police and the City of New York for your assistance.

#### Allison L. Arnson, BSN, RN, AERO Jet International

I am a flight nurse for Aero Jet International with eight years of critical care experience and have recently used Water-Jel on a pediatric patient with 85% full and partial thickness burns. This product is truly amazing! Upon application, immediate pain relief was observed and the patient required fewer analgesics to provide comfort during the flight for a burn of this severity. I highly recommend this innovative product for burn patients in all types of healthcare settings. Furthermore, I look forward to using the Water Jel products on future air ambulance transports.

#### Craig Clarke, E.M.T., Fire Chief, Track RescuQ

When we are working at an International Hot Rod Association or USAR Hooters ProCup event, we have a team of professionals including physicians, firefighters, and emergency medical technicians on site at all times. On one particular occasion, we had a driver splashed with fuel and the fuel found an ignition source, which resulted in burns on approximately 30% of his body. We used the Water-Jel product on him which significantly reduced his pain and suffering.

#### Kelly Dunkling, R.N., Nursing Coordinator Joslin Diabetes Center Children's Diabetic Camp

A camp staff person was lighting a fire and the fire ended up burning his face. The health care professionals on site applied Water-Jel immediately to his face, and the area where he had been covered with the gel ended up not having any scars.

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Section 4 Trauma

#### **Management of Superficial Burns**

Although superficial burns can be very painful, they rarely pose a threat to life unless they involve nearly the entire surface of the body. If you reach a patient with superficial burns within the first hour after the injury occurred, immerse the burned area in cool water or apply cold compresses to the burn. Burned hands or feet may be soaked directly in cool water; and towels soaked in cold water may be applied to burns of the face or trunk.

The objectives of this exercise are twofold: stop the burning process and relieve pain. Commercial products are available that meet both objectives **Figure 20-16 P**. However you cool the burn, take care not to cool the whole body don't let the patient become chilled. A dry sheet or blanket applied over the wet dressings will help prevent systemic heat loss.

Do not use salves, ointments, creams, sprays, or any similar materials on any type of burn. They will just have to be scrubbed off in the ED or burn unit, causing the patient further

#### In the Field

Pain medication is best given via the IV route. Owing to changes in fluid volume and tissue blood flow, absorption of any intramuscular or subcutaneous drug is unpredictable. Accurately measure and assess the patient's pain, and continuously monitor response to pain medication.

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pain. Never apply ice to burns because it can exacerbate the tissue injury.

No further treatment should be necessary in the field for an uncomplicated, superficial burn. Simply transport the patient in a comfortable position to the hospital.

#### **Management of Partial-Thickness Burns**

Treatment of partial-thickness burns in the field is similar to that of superficial burns. Cooling the burned area with water or application of wet or Water-Jel dressings within the first hour can diminish edema and provide significant pain relief. Burned extremities should be elevated to minimize edema formation.

Do not attempt to rupture blisters over the burn; they ini-



tially act as a physiologic burn dressing. Establish IV fluids with lactated Ringer's solution or normal saline as dictated by local protocol. Pain

in partial-thickness burns may be severe, so complete a pain assessment and administer pain medication as allowed by your protocols.



Figure 20-16 Sample burn dressing (Water-Jel).

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