Learning Analysis

Event Type: Mop-up Operations, Burn Injury
Date: August 10, 2015
Location: Nez Perce/Clearwater National Forest

EXECUTIVE SUMMARY

The Mystery Fire started on August 9, 2015 and was located on the Nez Perce-Clearwater National Forest Lochsa Ranger District. On August 10, 2015, at approximately 1530 hours, a firefighter on an Engine assigned to the Mystery Fire fell and burned the top of his right hand (dorsal surface).

NARRATIVE

The Mystery Fire was reported on August 9, 2015 at 2041 hours Pacific Standard Time. The fire was one of 130 fires spotted that day after lightening passed through the area earlier that day/night. The fire was located in timbered terrain with overgrown vegetation. After successfully controlling the fire, the Engine crew began mop-up operations. On day two of mop-up, the injured firefighter was spraying various hot spots along the fire perimeter with a mixture of foam and water. While spraying a particularly steep area, the firefighter slipped on the wet ground and began to fall backwards. As he fell, he extended his right arm to catch himself and felt a searing pain in his right arm; he had inadvertently placed his bare hand in an ash pit.

Immediately after seeing the fall, the Incident Commander (IC) and one EMT/firefighter from the Helitack crew, provided first aid to the injured firefighter. The responders quickly poured two canteens of water onto the burned extremity, attempting to cool the burned area. After cooling the burned area, the two responders then removed the injured firefighter's initial attack pack and aided him in walking up to the trail and to the engine.

After discussing means of travel, distance, time, risks, and the injured firefighter's condition, the IC decided that the injured firefighter would be transported via agency helicopter. It was approximately 1.5 hours by ground to the nearest hospital in Lewiston, ID.

TIMELINE

EVENT	DATE
Began Mop-up Operations on Mystery Fire	August 10, 2015
Firefighter slipped on wet ground	August 10, 2015
MEDEVAC flight to Lewiston, ID to St. Joseph Regional Medical Center (RMC)	August 10, 2015
Released from St. Joseph RMC Emergency Room, referred to Plastic Surgeon	August 10, 2015
Transported back to work station	August 11, 2015
Transported to Lewiston, ID; appointment with Plastic Surgeon	August 12, 2015
2nd appointment w/Plastic Surgeon; Requested referral to Burn Center	August 13, 2015
Transported to Harborview E.R. (w/Patient Advocate)	August 14, 2015

Received care at Harborview E.R. (debridement); seen by Burn Specialist	August 14, 2015
Admitted to Harborview Burn Center	August 14, 2015
Released from Harborview Burn Center	August 16, 2015
Arrived at Kooskia, ID; worked at District Fire Office	August 17, 2015
Released for Light Duty from Harborview Burn Center	August 26, 2015
Return to full duty	August 27,2015

INCIDENT FINDINGS

Employee Background

This is the injured firefighter's second season as a Wildland Firefighter. In May 2015, he went through refresher training (RT-130) for Wildland Firefighters. He has worked on approximately 16 fires and is currently qualified as a FFT2 (Firefighter Type 2).

Work/Rest Ratio

The injured firefighter's last day off was August 6, 2015 and the injury occurred on August 10, 2015. The injured firefighter's work/rest ratio was within guidelines.

Injury and Medical Response

After the injured firefighter "pulled" his hand out of the ash pit he immediately experienced intense pain. He was treated by the Incident Commander and an EMT from the Helitack crew. The injured firefighter was conscious and alert and able to answer all questions regarding his condition. After promptly "cooling" the burned surface of the hand, the EMT assessed the injured firefighter's condition. The hand appeared to be red with blisters forming on the surface. Concerns for swelling prompted the removal of his watch and clothing at the site of the burn.

The burn seemed to have a concomitant appearance of superficial (1st Degree) and partial thickness burns (2nd Degree). As a result, the injured firefighter was immediately flown via agency helicopter to St. Joseph's Regional Medical Center (RMC) in Lewiston, ID. The injured firefighter received initial treatment for his burned hand by the Emergency Room personnel. They gently cleansed the burned area and wrapped it loosely with sterile dressings. The injured firefighter was released and referred to the local Plastic Surgeon for further care. On the morning of August 12, 2015 the injured firefighter was seen by the local Plastic Surgeon, and given packets of Silvadene (antibacterial), sterile bandages, and a prescription for an over the counter pain reliever and was released, the firefighter was then driven back to his work center. That evening the injured firefighters' supervisor suggested he be referred to a Burn Center. On August 13, 2015, the injured firefighter was transported back to St. Joseph's RMC for follow-up care. The injured firefighter was accompanied by an

EMT and a Forest Service Patient Advocate. The firefighter once again was seen and treated by the local Plastic Surgeon, unhappy with the medical treatment given; the injured firefighter and his Patient Advocate requested a referral to the Harborview Burn Center in Seattle, WA. The injured firefighter and his Patient Advocate explained to the Plastic Surgeon the agency's protocols for burn injuries.

According to the American Burn Association (ABA):

Burn Center Referral Criteria

A burn center may treat adults, children, or both. Burn injuries that should be referred to a burn center include:

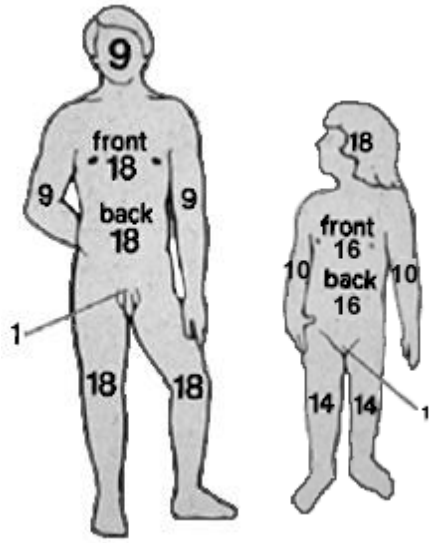
1. Partial thickness burns greater than 10% total body surface area (TBSA).
2. Burns that involve the face, hands, feet, genitalia, perineum, or major joints.
3. Third degree burns in any age group.
4. Electrical burns, including lightning injury.
5. Chemical burns.
6. Inhalation injury.
7. Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality.
8. Any patient with burns and concomitant trauma (such as fractures) in which the burn injury poses the greatest risk of morbidity or mortality. In such cases, if the trauma poses the greater immediate risk, the patient may be initially stabilized in a trauma center before being transferred to a burn unit. Physician judgment will be necessary in such situations and should be in concert with the regional medical control plan and triage protocols.
9. Burned children in hospitals without qualified personnel or equipment for the care of children.
10. Burn injury in patients who will require special social, emotional, or rehabilitative intervention.

Excerpted from Guidelines for the Operation of Burn Centers (pp. 79-86), Resources for Optimal Care of the Injured Patient 2006, Committee on Trauma, American College of Surgeons

Severity Determination

First Degree (*Partial Thickness*)
Superficial, red, sometimes painful.
Second Degree (*Partial Thickness*)
Skin may be red, blistered, swollen. Very painful.
Third Degree (*Full Thickness*)
Whitish, charred or translucent, no pin prick sensation in burned area.

Percentage Total Body Surface Area (TBSA)



Also, according to the NWCG Red Book:

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Required Treatment for Burn Injuries

The following standards will be used when any firefighter sustains burn injuries, regardless of agency jurisdiction.

After on-site medical response, initial medical stabilization, and evaluation are completed, the Agency Administrator or designee having jurisdiction for the incident and/or firefighter representative (e.g. Crew Boss, Medical Unit Leader, Compensations for Injury Specialist, etc.) should coordinate with the attending physician to ensure that a firefighter whose injuries meet any of the following burn injury criteria is immediately referred to the nearest regional burn center. It is imperative that action is expeditious, as burn injuries are often difficult to evaluate and may take 72 hours to manifest themselves. These criteria are based

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upon American Burn Association criteria as warranting immediate referral to an accredited burn center.

The decision to refer the firefighter to a regional burn center is made directly by the attending physician or may be requested of the physician by the Agency Administrator or designee having jurisdiction and/or firefighter representative.

The Agency Administrator or designee for the incident will coordinate with the employee's home unit to identify a workers compensation liaison to assist the injured employee with workers compensation claims and procedures. Workers compensation benefits may be denied in the event that the attending physician does not agree to refer the firefighter to a regional burn center.

During these rare events, close consultation must occur between the attending physician, the firefighter, the Agency Administrator or designee and/or firefighter representative, and the firefighter's physician to assure that the best possible care for the burn injuries is provided.

Burn Injury Criteria

- Partial thickness burns (second degree) involving greater than 5% Total Body Surface Area (TBSA).
- Burns (second degree) involving the face, hands, feet, genitalia, perineum, or major joints.
- Third-degree burns of any size are present.
- Electrical burns, including lightning injury are present.
- Inhalation injury is suspected.
- Burns are accompanied by traumatic injury (such as fractures).
- Individuals are unable to immediately return to full duty.
- When there is any doubt as to the severity of the burn injury, the recommended action should be to facilitate the immediate referral and transport of the firefighter to the nearest burn center.

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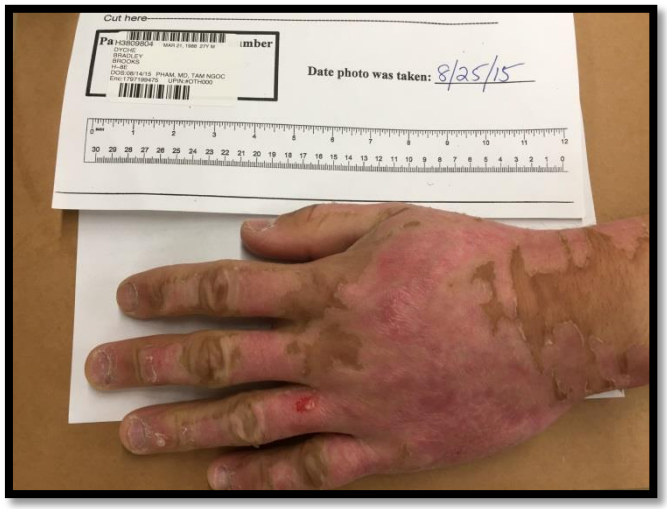
Rule of Nines:

The rule of nines is a standardized method used to quickly assess how much Total Body Surface Area (TBSA) has been burned on a patient. This rule is only applied to partial thickness (2nd degree) and full thickness (3rd degree) burns.

An alternative method to calculating the BSA is to compare it to the size of the patient's palm, which equates to approximately 1% TBSA. For example, if a burn area is the size of (5) palm surfaces, the burn would be roughly 5% TBSA.

After being informed of NWCG Burn Protocols the Plastic Surgeon referred the injured firefighter to the Harborview Burn Center, outpatient clinic. The employee was transported to Harborview Burn Center on August 14, 2015. Upon arriving to the Harborview Emergency Room the employee received treatment to his hand to include debridement (removal) of dead tissue and blisters. The injured firefighter was seen by a member of the Harborview Burn Team and was admitted immediately to the Harborview Burn Center for care and remained hospitalized for two days. Upon being released, the firefighter was given home Physical Therapy exercises and instructed to email pictures of his hand and to "FaceTime" his progress to the burn specialists. On August 27, 2015, the firefighter was released and authorized to return to full duty. The firefighter is expected to make a full recovery.



Personal Protective Equipment

The injured firefighter was wearing the following PPE during Mop-up Operations:

- Nomex pants and shirt
- Hardhat
- Eye protection
- Fire boots
- Initial Attack Pack

The injured firefighter reported he was not wearing his leather gloves at the time he was handling the hose and spraying down hot spots. Since the crew was involved in performing "cold-trailing" and "bone piling" techniques, he felt he would not be able to discern if a branch was "hot" to the touch or not. He also stated this was a common technique and his entire crew doesn't wear gloves during these Mop-up operations (cold trailing and bone piling).

Cold Trailing- A method of controlling a partly dead fire edge by carefully inspecting and feeling with the hand for heat to detect any fire, and lining and live edge.

Bone Piling- A technique that involves moving a stack of black chunks, limbs, etc., usually far enough out in the black to prevent embers from scattering or being blown into the green.

WHAT WENT WELL

- Firefighter was within work/rest guidelines.
- Communications were good between the Engine crew, Dispatch, Helitack crew and Helicopter.
- Prompt intervention in Emergency Medical treatment.
- Patient was quickly transported to a care facility.
- Excellent support from Incident Business Advisor, AFMO, and Patient Advocate.
- Patient was eventually treated by a Burn Facility.

RECOMMENDATIONS

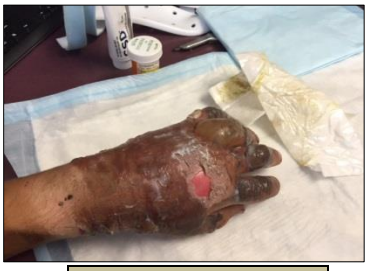
The analysis of this incident yielded the following recommendations.

Recommendation 1: Reinforce and/or educate employees on Burn Protocols within the agency, so they are aware of determining the level of emergency medical resources needed to treat certain injuries (i.e. trauma, burns, cardiac). By knowing agency protocols involving burn injuries, an injured employee can ask their physicians about specialized care. They are more likely to receive specialized care than patients who do not know or seek the latest treatments for these types of injuries. Studies have shown that patients can influence their own treatment with increased knowledge and awareness of their own injuries.

Forest Service management needs to review the 2015 NWCG Burn Injury Criteria and the 2015 American Burn Association (ABA) Burn Injury Criteria. There are inconsistencies in the measures of Total Burned Surface Area (TBSA), in which the guidelines for NWCG are 5% vs. ABA is 10%. Better education, standards, and Medical Direction on whether the Agency Administrator or designee having jurisdiction and/or firefighter representative are required to follow the NWCG Burn Injury Criteria, solely, or whether the ultimate decision rests with attending physician on patient referral to a burn unit.

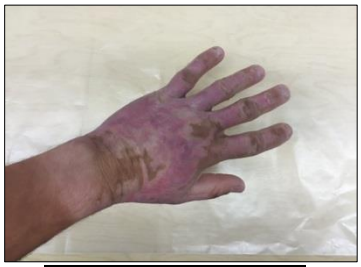
Recommendation 2: Management and agency first responders should re-acquaint themselves with the NWCG Red Book and the American Burn Association Burn Injury Criteria and fully understand Total Body Surface Area (TBSA) guidelines. Keep in mind that burn injuries may take 72 hours to manifest following injury and management and first responders must identify those patients requiring transfer to a burn center.

PROGRESSION OF A BURN:

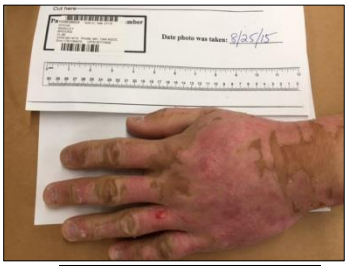


August 12
Day 2 after burn

August 16
Day 6 after burn



August 23
Day 13 after burn



August 25
Day 15 after burn

Recommendation 3: Forest Service management should emphasize and support basic and advanced Emergency Medical training (i.e. Basic First Aid, First Responder, EMT), for employee care throughout the Forest Service. By providing Emergency Medical training the agency is not only educating employees on how to treat a patient but it also empowers the injured employee(s) to be vigilant in their own care.

Recommendation 4: Provide training and/or re-train employees on when it is acceptable to work on a fire without proper PPE (gloves). Some methods such as “cold trailing” warrant the removal of a glove to inspect area’s along the line that may have stored “heat” in them. The technique of “bone piling” usually requires one to move material s with a gloved hand. Re-educate crew members and leadership on the ability to discern when to work without required PPE and to assess the risks involved and/or recognize mitigation factors to such hazards.

Recommendation 5: Establish guidelines and "trigger points" as to when to assign an injured employee a representative/advocate for assistance in managing necessary paperwork, attaining proper medical care, and providing support and guidance. A Hospital Liaison/Patient Advocate can help the injured employee make better decisions, especially when he or she is on medications, under stress, etc. A Hospital Liaison/Patient Advocate can:

- Provide explanations of medical procedures.
- Provide options to the recommended treatment.
- Complete paperwork.
- Help the patient navigate the healthcare system.
- File paperwork with OWCP.
- Follow up with the patient, healthcare provider, or OWCP.
- Arrange outside support services, such as Employee Assistance Program (EAP) counseling.

Regional and/or Forest management should design and create a Hospital Liaison/Patient Advocate program template. By having a written program the role, function, knowledge and skills of a Hospital Liaison/Patient Advocate will be recognized and training be provided to designated employees. Training will include processes and protocols for:

- Notification procedures.
- Knowledge of local medical facilities, pharmacies and hotels.
- Procedures for arrival at the Medical Facility, ER, for Medical Center admittance and release.
- Knowledge of necessary FS forms, Department of Labor (DOL) and OWCP forms and processes.

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