

# TRAINING NOTES



## Preventing Heat Injuries:

### A Commander's Guide

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Much has been written about heat injury and its prevention, including the symptoms of each category of injury and what to do about salt and water replacement. But heat injury is more subtle and has an even greater effect on troops than previously realized.

Because of this subtlety, and because some of the ideas about heat injury and its symptoms have been shown to be inaccurate, commanders need a detailed prescription to go by. They need help in understanding and implementing programs to prevent heat injuries in their units; they need detailed guidance on what to do, why, when, how often, how much, and when *not* to do something. They also need to know which references or Army Regulations are applicable.

The following actual case histories graphically illustrate some incidences of unrecognized heat injury:

- A patrol was moving through the jungles of Vietnam when a soldier suddenly grabbed his head and began screaming. When his buddies tried to help him he fought them with convulsive strength. After he was knocked out and sent to a hospital, it was found that his body temperature was

107°F before he died.

- In the seventh week of basic training at Fort Jackson, a number of apparently healthy trainees were standing in line for breakfast when one of them fainted. He was taken to the hospital, where he died two hours later.

- A mechanic who had been at the National Training Center (NTC) at Fort Irwin for four days was walking to the motor pool when he doubled over in pain. He was sent to the hospital as a suspected appendicitis case, but all symptoms disappeared when the water level in his body was brought back to normal.

- Another soldier at the NTC was referred to a psychologist after a week of apparent dereliction of duty, such as sleeping on guard mount and in formations (although he had never been in trouble in two years of service). He complained of chronic fatigue and sleepiness. The psychologist, on a hunch (and with medical supervision), had the soldier drink three liters of water, and in a few hours he felt awake and energetic for the first time in more than a week. He was returned to duty and had no subsequent medical or disciplinary problems.

One important observation from these examples is that fatal heatstroke can occur even when a soldier is sweating, not dry, as many people believe he must be. Another observation is how heat stress can subtly debilitate entire units and affect their performance by weakening them physically and dulling their thought processes:

- A Marine battalion was training at Twentynine Palms, California, and because of transportation difficulties had only a third of the water it needed. The shortage not only dehydrated the Marines, lowering their resistance, but also helped cause a sanitation problem in the battalion mess. In an eight-hour period nearly every member of the battalion ended up on the sick list with a combination of dehydration and food poisoning. It was three days before enough Marines were considered fit enough for the battalion to begin functioning as a unit again.

- A study of two U.S. Army armor battalions in training at the NTC showed that when one battalion had problems supplying its troops with food and water it had three times as many casualties as the other battalion. Not only were there more injuries and illnesses, but the cases were more

severe, calling for medical evacuation, hospitalization, and, in some cases, surgery.

The factors leading to heat injury can be any one or a combination of the following:

- High temperature.
- Heavy physical work load (even when the temperature is around 70°F).
- Dehydration caused by sleep loss, drinking alcohol or drinks with caffeine, not drinking enough water to replace sweat loss, low humidity, dry and/or high winds, and too much salt relative to water intake.
- High humidity, which reduces heat loss through sweating.
- Pre-existing illnesses (cold, "flu," and the like).

Because the physical processes leading to heat injury are simple, a commander can easily institute simple programs to prevent or reduce the effects of heat on his unit. The commander of a mechanized infantry battalion training at the NTC, for example, reduced his unit's sick call by 30 percent by having several classes given on the nature and prevention of heat injuries.

## FIVE WAYS

There are essentially five ways in which a commander can influence the effect of heat on his unit. The first is to educate all members of the unit on the nature and prevention of heat injuries. The commander can use his medical platoon to give the classes and to monitor the troops in training and on operations. In cases where dehydration and heat stress are threats, he and his medical personnel can refer to the field manuals on desert, jungle, and mountain operations, as well as TB MED 175 and FM 10-52-1, for guidance.

During active operations, a commander must consider three items: rest, food, and water. Both training and combat disturb the normal opportunities for rest. As troops become fatigued, they begin to dehydrate and use up to three times the normal amount of energy to do the same work. Rest allows their bodies to

recover from exhaustion and to get rid of the excess heat built up by work. Unit leaders, by monitoring the level of fatigue and heat stress so the troops can get as much rest as the situation will allow, can help preserve the unit's mental and physical capabilities.

Hard-driving troops use up a lot of energy in work and sweat. Those soldiers who do not get enough to eat will quickly become exhausted and, therefore, prone to heat injuries; those who do not get enough salt in their diet will develop heat cramps. Observations indicate that the body is very sensitive to its salt needs and will adjust its own salt intake accordingly if allowed to do so. Both "C" and "LRRP" rations provide excess salt because it is used to preserve the food. The "MRE" ration may also provide too much, and additional salt is included with all these packaged rations. The "A" rations, on the other hand, will not provide enough salt in the food itself, and extra salt should be available with them.

Troops who are allowed to salt their food to their personal tastes and to eat their three meals a day do not get heat cramps. Using too much salt at meals, however, or gobbling salt pills "to prevent heat injury," can actually dehydrate the body and lead to a higher number of heat injuries and illnesses than if the extra salt had not been taken.

## WEAPON

Water is the main weapon to use against heat injuries. It is essential to remember that the thirst drive induces a person to take in only two-thirds of the water he loses in sweat. This explains why apparently fit troops will suddenly drop from heat exhaustion or heat stroke although they have been able to quench their thirst at will.

At the NTC, a three-part pattern developed with troops who went there for training:

- The troops who quenched their thirst with beer and soda pop collapsed with heat injuries after three days (those drinks only dehydrated them and made them feel dull).

- The troops in the field who drank only enough water to quench their thirst collapsed on either the sixth night or the seventh morning.

- The troops in garrison who drank only water, and then only to quench their thirst, collapsed on the eighth night or ninth morning.

Once this pattern was recognized, an education program was created for the rotating units and the pattern all but disappeared.

Whenever a unit is exposed to heat stress, its commander must emphasize the importance of an adequate supply and intake of water. A soldier can lose more than a liter of water an hour in sweat when he is working hard. This means that logistics planning in hot environments should include three or more gallons of drinking water per man per day. While this may seem like a lot, observers of the workers building the Hoover Dam in its desert canyon found that each worker was drinking *six and a half* gallons of water per day on his own.

A commander must remember, too, that he and his other leaders are also subject to heat stress and injuries. Because heat and fatigue first affect the thought processes, unit leaders must take care of themselves as well as their soldiers. All too often in exercises, the people in leadership and staff positions stay on the go around the clock during the first days until they are exhausted. This leaves the unit without effective command and control systems in the final days of the exercise. In combat, this can reduce the unit's ability to respond to and defeat the opposing forces.

Heat injury is an insidious and lethal enemy. But commanders can implement simple programs to reduce or eliminate its effects. All they need to do is to recognize the enemy and to attack it before it can get to their soldiers.

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