Heat illness should be classified as mild, moderate, or severe, on a continuum, rather than by the more traditional categories of cramps, exhaustion, and stroke. A tool should be used to obtain an objective, specific diagnosis as to the severity of the illness. A common scale should be used by all disciplines of medicine and by all providers of sports health care. The Kleiner Exertional Heat Illness Scale can be a valid and reliable tool to assist in recognizing and treating heat-related illness. 

Key Points

Heat illness should be classified as mild, moderate, or severe, on a continuum, rather than by the more traditional categories of cramps, exhaustion, and stroke.

A tool should be used to obtain an objective, specific diagnosis as to the severity of the illness.

A common scale should be used by all disciplines of medicine and by all providers of sports health care.

The Kleiner Exertional Heat Illness Scale can be a valid and reliable tool to assist in recognizing and treating heat-related illness.

Key Words: cramps, exhaustion, index, stroke

Several publications and position statements related to heat illness can be found in the literature. These are excellent documents that should be read by every athletic trainer and therapist, but there are some inherent problems in the way we recognize and categorize heat-related illness. Categories of both exertional and classic heat illness have included prickly heat, heat syncope, heat edema, heat tetany, heat cramps, heat exhaustion, and heat stroke. Unfortunately, these categories are not universally accepted and used by clinicians from the various disciplines within the medical field. Another problem is the basis on which distinctions are made among these various categories. What determines heat cramps versus exercise heat exhaustion? Is it simply the presence or absence of cramps? When is heat syncope not heat exhaustion? The most critical distinction must be made between heat exhaustion and heat stroke, with the latter being a medical emergency that requires immediate treatment.

I propose that the three traditional categories of heat cramps, heat exhaustion, and heat stroke be replaced with the terms mild, moderate, and severe heat illness. I also recommend that we consider heat illness as a continuum of physiologic states (see Table 1), rather than three distinct stages.

To address the lack of consistency among the different classification systems used by various practitioners, the Kleiner Exertional Heat Illness Scale (KEHIS) has been developed (Tables 2 and 3). This scale eliminates the use of nondescriptive terminology and was designed to provide an objective assessment of heat-illness severity.

Background

Heat illness is a serious and potentially life-threatening disorder that is regularly encountered in physically active individuals. It often occurs in marathons and other endurance events, where athletes might generate more heat than they are able to dissipate (Kleiner & Glickman, 1994). Football players are also at great risk because of their body size, equipment, and practice conditions. Several risk factors have been identified as contributors to heat illness, including an athlete’s hydration status, previous history of heat illness, environmental factors, and intensity of exercise.

Historically, athletic trainers and therapists have differentiated heat exhaustion from heat stroke on the basis of the presence or absence of sweating, whereas other medical providers have used core temperature or changes in mental status as the primary indicators. The fact that different professionals have different criteria prompted the development of a universal heat-illness scale. Similar to the Glasgow Coma Scale, the Kleiner Exertional Heat Illness Scale (KEHIS)
uses a point system assigned to various signs and symptoms. The range for the KEHIS is zero to 25.

**Categorizing Heat Illness**

Much controversy has surrounded the situation that currently exists with concussion scales. There are at least 2 dozen scales for grading concussions, each being used by a different medical specialty. Although no numeric scale for grading heat illness was available prior to the KEHIS, there was a similar problem with inconsistent methods for diagnosing and categorizing heat illness.

Traditionally, athletic trainers and therapists have used the categories heat cramps, heat exhaustion, and heat stroke. Less traditional categories of heat syncope, exercise heat cramps, exercise heat exhaustion, and exertional heat stroke have also been used. It is important to distinguish between exertional heat stroke and “classic” heat stroke because the etiology, onset, progression, and sequelae of heat illness in the athletic population differ from those observed in the sedentary population, regardless of the severity.

A simple solution to this dilemma is to categorize heat illness as mild, moderate, or severe. The term stroke in relation to heat illness is not representative of the associated physiologic processes. The terms mild, moderate, and severe are recognized by all medical specialties, and they reinforce the view of heat illness as a continuum of physiologic states.

**Exertional Versus Nonexertional Heat Illness**

Exertional heat illness is a leading cause of preventable noncontact fatalities in athletes. The pathophysiology of exertional heat illness is thought to be multifactorial and can include malfunction of the temperature-control center in the brain, precipitated by energy depletion. Exertional heat illness develops when the heat generated by physical activity exceeds the body’s ability to rid itself of excess heat. This occurs most often when environmental conditions inhibit the body’s ability to cool itself. As the air temperature rises, the body becomes unable to dissipate heat to the environment. When the relative humidity is high, evaporative heat loss is impaired. Physical activity and hydration status play key roles in the development of heat illness. When vigorously exercising, the body’s heat production can increase core temperature substantially. Fluid loss as