



# Building Blocks of Clinical Practice

Helping Athletic Trainers Build a Strong Foundation



## Issue #9: Types of Heat Illness

### Heat Exhaustion

Needs to be differentiated by assessing core body temperature

#### Signs and Symptoms:

- core body temperature < 104° F
- difficulty in continuing to exercise in the heat
- dizziness, lightheadedness, headache
- nausea, diarrhea
- persistent muscle cramps

### Heat Stroke

Third most common cause of death in athletes; can occur in mild conditions

#### Signs and Symptoms:

- core body temperature > 104° F
  - \* need for immediate assessment; only valid method is rectal temperature
- CNS dysfunction
  - \* dizziness, confusion, irrational behavior, aggressiveness, seizures, coma
- hot and wet or dry skin; hypotension; tachycardia; hyperventilation; vomiting; diarrhea; convulsions

### Hyponatremia

Condition with low blood sodium values (<130 mEq/L); may progress to fatal encephalopathy

#### Risk Factors:

- excessive sweat sodium losses that are not replaced
- overdrinking hypotonic fluids

#### Signs and Symptoms:

- overdrinking
- nausea, vomiting, dizziness
- peripheral swelling or tingling
- altered mental status
- seizures

#### Preventative Measures:

- develop individual hydration plans based on fluid and electrolyte losses
- ensure athletes consume adequate dietary sodium

### Rectal Temperature Assessment

- Have patient roll onto side
- Drape a towel for privacy of patient
- Lubricate probe
- Turn thermometer unit on
- Flex the hip to expose the rectum
- Insert probe approximately 4 inches into the rectum – if you meet resistance do not force it, back out and try again
- Obtain body temperature after temperature reading has stabilized



### Exertional Sickling

Condition where sickle cell trait (SCT) carrier's red blood cells sickle under exertional stress decreasing blood flow that can lead to ischemia or rhabdomyolysis

#### Risk Factors:

- heat stress
- dehydration
- asthma
- illness
- altitude stress

#### Signs and Symptoms:

- generalized muscle cramping and pain; typically lower extremity and back
- swelling
- weakness, fatigue
- inability to catch one's breath

#### Preventative Measures:

- recognition and monitoring athletes with SCT
- slow training progression with longer rest/recovery periods
- exclusion from performance tests
- availability of supplemental oxygen when the athlete with SCT trains or competes at altitude



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### Risk Factors for Heat Illness

<i>Intrinsic</i>	<i>Strategies to Minimize Risk</i>
High intensity exercise	Gradually phase in exercise and conditioning
Fever or illness	Monitor and remove at risk athletes as necessary
Dehydration	Educate coaches/athletes on proper hydration Provide adequate access to water
Overweight/obesity	Gradually phase in exercise and conditioning
Lack of heat acclimatization	Follow heat acclimatization program
Medications (antihistamines, diuretics, ADHD drugs)	Monitor and remove at risk athletes as necessary
Skin disorder (sunburn or malaria rubra)	Monitor athletes closely
Predisposing medical conditions	Monitor and remove at risk athletes as necessary
<i>Extrinsic</i>	<i>Strategies to Minimize Risk</i>
High ambient temperature, solar radiation or humidity	Avoid exercise in hotter parts of the day
Heavy gear or equipment	Gradually introduce equipment
Poor practice design	Educate coaches regarding strategies to minimize risk

### Differential Diagnosis of a Collapsed Athlete with Heat Illness

<i>Sign/Symptom</i>	<i>Heat Exhaustion</i>	<i>Heat Stroke</i>	<i>Hyponatremia</i>	<i>Exertional Sickling</i>
Core temperature < 104°F	X		X	X
Core temperature >104°F		X		
Blood sodium values <130 mEq/L			X	
Blood sodium values >130 mEq/L	X	X		X
CNS dysfunction	X	X	X	
Loss of consciousness		X	X	X
Nausea	X	X	X	
Peripheral swelling			X	X
Seizures		X	X	
Muscle cramping	X			X
Fatigue	X			X
Inability to catch one's breath				X

#### References

1. Casa DJ, Armstrong LE, Kenny GP, O'Connor FG, Huggins RA. Exertional heat stroke: new concepts regarding cause and care. *Curr Sports Med Rep.* 2012;11(3):115–123. doi:10.1249/JSR.0b013e31825615cc.
2. Binkley HM, Beckett J, Casa DJ, Kleiner DM, Plummer PE. National Athletic Trainers' Association Position Statement: Exertional Heat Illnesses. *J Athl Train.* 2002;37(3):329–343.
3. Casa DJ. *Preventing Sudden Death in Sport and Physical Activity.* Jones & Bartlett Publishers; 2011.
4. [ksi.uconn.edu](http://ksi.uconn.edu)
5. Casa DJ, Guskiewicz KM, Anderson SA, et al. National Athletic Trainers' Association Position Statement: Preventing Sudden Death in Sports. *J Athl Train.* 2012;47(1):96–118.

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