



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 $< 104^{\circ}\text{F}$
- 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 $> 104^{\circ}\text{F}$
 - * 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 ($<130\text{ mEq/L}$); 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

Intrinsic	Strategies to Minimize Risk
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
Extrinsic	Strategies to Minimize Risk
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

Sign/Symptom	Heat Exhaustion	Heat Stroke	Hyponatremia	Exertional Sickling
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

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