

SPORTS MEDICINE DEPARTMENT

Dallas Independent School District

(September 1986)

Middle School Athletics

Exertional Heat Illness

Guideline Handbook

- Guidelines: Early August/September Football Practice
 - Ø Monitoring Heat
 - Ø Practice Adjustments
 - Ø Weight Charts
 - Ø Water Breaks/Station
 - § Cooling Tank
 - Ø Practice Sessions
 - § 1st Day of School/1st Day of Practice

- Warnings
 - Ø Medical Symptoms/Emergent Care
 - Ø Treatment
 - Ø Observation
 - Ø Be Smart

- Medical Information
 - Ø Common Elements
 - Ø Definitions
 - Ø Risk Factors
 - Ø Medical Conditions
 - Ø Management of Care
 - Ø Prevention

SPORTS MEDICINE DEPARTMENT

Dallas Independent School District

Middle School Athletics

Exertional Heat Illness Guidelines

The following guidelines have been developed to prepare high school coaching staffs and their student-athletes the necessary opportunities to reduce the risks associated with Exertional Heat Illness during early August and September football practice. Mandatory water breaks and the “Medical Information” component of the handbook apply to football and all other middle school sports.

Weight Charts are not as necessary to the middle school football program that reduces the intensity and duration of their football practices and do not mirror those practice sessions of a high school football program.

Cooling Tanks are essentially necessary for the immediate cooling of an athlete’s core temperature. If your preseason practice schedules are of high intensity and with duration that are similar to high schools, then a cooling tank is required for your emergent care station.

Middle school football practices could be generally described as less intense and more instructional which lessens the physiological challenges and helps reduce the exposure to exertional heat illness.

It is strongly suggested that middle school practice schedules that mirror the intensity and duration of a high school program should follow the “Exertional Heat Illness Guidelines” described to support high school football practice.

Dallas ISD Guidelines

Early August/September Football Practice

- Monitor the heat. Sling Psychrometer
 - ü 80 degree wet bulb – *High Risk!*
 - ü See practice adjustments, next page.
- Document the wet bulb temperature.
- Modify and adjust practice according to risk.
Helmets/shorts.
- Add water breaks and rest breaks.
- Reduce or eliminate post practice conditioning.

Sling Psychrometer Readings

Wet Bulb Temperature/Practice Adjustments

- Under 60 degrees F
 - ü None necessary
- 61 to 65 degrees F
 - ü Observe all athletes, particularly those who loose considerable weight
- 66 to 72 degrees F
 - ü Watch suspected players carefully.
- 73 to 79 degrees F
 - ü Alter practice schedule to provide additional rest/water breaks.
- 80 degrees F and higher
 - ü Postpone practice or conduct workouts in helmets/shorts.
eliminate post-practice conditioning.

Water Breaks

- § Water accessible upon request
- § Mandatory every 20-30 minutes.
- § Strongly recommend a 5-10 minute full rest and water break, in the shade, after each hour of practice during acclimating period.

Weight Charts

(1st 10 days of practice)

Middle Schools

Weight charts are designed to identify weight loss and weight loss recovery, for high school 2 a day and double AM practice seasons.

Application for middle school practice seasons are as follows:

- Practice sessions that emulate high school sessions with duration and intensity.
 - Athletes that have a poor conditioning history.
 - The athlete with a high, >than 30% body mass index. (the over-weight athlete)
 - The type “A” athlete that represents high intensity and strong work ethics.
-
- Weigh your athletes prior to practice and after.
 - 2% or > must be watched.
 - Must regain weight to the 2% or under to return to practice.

Water/Emergent Care Station

- § Cooling Tank, ½ filled with cool water
 - ü4 – Ten gallon water coolers, filled w/ice
- § Large Quantities of Ice and Cold Water
 - üDrinking Water
 - üEmergency Ice/Cooling Tank
- § Shade; Suggested

1st Day of Practice & 1st Day of School

(Practices during afternoon athletic period when
AM/PM schedules are not available)

§ 1 1/2 - 2 hour practice

üSolid conditioning history of athletes.

üAdditional water breaks.

üIncrease the length of water breaks.

üNo post-practice conditioning

Warnings:

§ Vomiting

§ Warning sign; treat, error on safety!

§ The athlete does not continue practice

§ The athlete does not practice for 24 hours.

§ > than 2 athletes that are in heat stress;

§ Practice must be shut down!

§ Warning sign

§ Not enough medical care available.

Medical Symptoms; Emergent Care

- § Dry hot skin; only <30% actually have this symptom. Probably too late!
- § Mental changes
- § Collapse
- § > than 30 minutes of care and observation.
 - § Call 911

Treatment

- § Remove clothing/uniform
- § Submerge torso into the Cooling Tank
 - ü Ice water w/towels or sponges and bath head/neck and torso
- § Ice the head and neck.
- § Cold environment; circulating fans.
- § Fluids
- § > than 30 minutes; call 911

Observation:

- § Lumping; conditioned athlete vs non-conditioned
 - § Expectations appear to be the same.
- § Grossly overweight; mass body index
 - § Extreme risk
- § Underachiever?
 - § Are they? Or are they physically spent?
- § Coaches; one more time, “We are not leaving until we have done it right”!
- § Post-practice conditioning; strip to the waist
- § Remove helmets when ever possible
 - § 20-25% body heat

Be Smart!

- § Common sense goes a long way!
- § Meet with players prior to the start of fall workouts and review with them each day.
 - § Diet
 - § Rest
 - § Medical history; anyone have a cold, not sleeping good at night, AC out, had your wisdom teeth pulled?
 - § Position coaches should share information
- § Include DISD's medical staff

Medical Information

- § Common Elements
- § Definitions
- § Risk Factors
- § Medical Conditions
- § Management of Care
- § Prevention

Common Elements

Exertional Heat Illness

- § Hot/humid
- § 2nd and 3rd day of practice
- § Large young men
- § All vomited during current or preceding practice, yet allowed to continue to practice.
- § Did not perform up to usual or expected level of skill
- § Wearing more than shorts and T-shirts before being acclimated to heat

Definitions

- § **Heat Cramps** - acute involuntary muscle contractions caused by dehydration, electrolyte imbalance, and neuromuscular fatigue.
- § **Heat Exhaustion** - inability to continue exercise and associated with heavy sweating, dehydration, sodium loss, energy depletion. Core temperature normal or mildly elevated.
- § **Heat Stroke** - elevated core temperature ($> 104^{\circ}$) with neurologic changes.

Diagnosis of Heat Stroke

- § Core temperature usually above 104°F with mental status/neurologic changes
- § Time above 106° appears to be most critical factor affecting survival.
- § Unable to check rectal temperature - start treating.

Thermoregulation

- § Basal metabolic rate is 60 to 70 kcal/h
- § Approaches 1000 kcal/h during strenuous activities
- § Muscular athletes generate more heat
- § Obese athletes have difficulty dissipating heat because of insulation

Acclimatization

- § Physiologic response produced by repeated exposures to hot environments
- § Rate of acclimatization is related to aerobic conditioning and fitness
- § 10 to 14 days necessary for a protective level to be achieved, but maximum acclimatization can take 2 - 3 months.
- § Fluids and salt facilitate process.
- § 1 to 2 hours to get effect physiologic changes

Physiologic Responses to Acclimatization

§ Heat rate	Decrease
§ Stroke volume	Increases
§ Core temperature	Decreases
§ Sweat output/rate	Increases
§ Onset of sweat	Earlier in training
§ Salt in sweat	Decreases
§ Work output	Increases
§ Fatigue	Decreases
§ Work capacity	Increases
§ Plasma volume	Increases

Risk Factors

- § Non-environmental
- § Environmental
- § Predisposing Medical Conditions
- § Adolescent

Nonenvironmental Factors

- § **Dehydration** - sweating, vomiting, diarrhea, medications, alcohol. Check body weight, color of urine
- § **Barriers to evaporation** - uniforms, helmets, rubber/plastic suits.
- § **Illness**
- § **Prior heat illness**
- § **Increase body mass index (BMI)**

Nonenvironmental Factors

- § Poor physical condition - elevated core temperature after 20 - 30 minutes of strenuous activity.
- § Excessive or dark clothing.
- § Overzealousness.

Environmental Risk Factors

§ $WBGT = 0.7_{wb} + 0.2_{bg} + 0.1_{db}$

§ Determined for athletes wearing T-shirt and shorts.

§ See attached risk chart

§ See attached figures for adjustments for uniforms.

Medical Conditions

- § Sickle Cell Trait
- § Cystic Fibrosis
- § Scleroderma
- § Arteriosclerotic Vascular Disease
- § Neuroleptic Malignant Syndrome
- § Malignant Hyperthermia
- § Obesity (BMI > 30)

Children - Adolescents

- § Greater surface area to body mass
- § Higher metabolic activity
- § Slower rate of sweating
- § Sweating starts at higher temperature
- § Lower C.O. at given metabolic rate
- § Slower to acclimatize to heat
- § Thirst response is blunted

Mental Status/Neurologic Changes

- § Confusion
- § Disorientation
- § Dizziness
- § Drowsiness
- § Coma
- § Loss of consciousness
- § Psychotic behavior
- § Staggering
- § Aggressiveness
- § Delirium
- § Irritability
- § Apathy
- § Hysteria
- § Seizures

Physical Signs

- § Dehydration
- § Hot and wet or dry skin
- § Tachycardia
- § Hypotension
- § Vomiting
- § Diarrhea
- § Weakness
- § Hyperventilation

Management of Heat Stroke

§ ABCs

§ Cooling - (anyway you can). Goal is to cool to 101° to 102° core body temperature.

ü Remove clothing and equipment

ü Cold water immersion (35° to 59°F)

ü Ice bags to groins, axilla, face, sponging

§ Call 911

Complications of Heat Stroke

- § Cardiac damage/failure
- § Hepatic necrosis
- § Rhabdomyolysis
- § DIC
- § ARDS
- § Renal failure

Risk of Recurrence

- § Elevated liver enzymes
- § Proportional to mental status changes
- § Recovery from heat stroke can be up to more than one year
- § 15% to 20% have decrease heat tolerance
- § Heat intolerance can last up to 5 years

Prevention

- § Anticipation/preparation/education
- § PPE to identify those at risk.
- § Acclimatization over 10 to 14 days
- § Fluid replacement
- § Sleep in cool environment
- § Check environmental conditions before, during practice
- § Rest breaks, 2 to 3 hours for meals
- § Buddy system

Fluids

- § 17 - 20 ounces (500 - 600 mL) 2 to 3 hours before practice
- § 7 - 10 ounces (200 - 300mL) every 10 - 20 minutes during practice
- § Correct any fluid loss post exercise within 2 hours (< 2% of body weight)
- § Replenish fluid, carbohydrates, and electrolytes
- § Serve cool fluids (50° to 59°F)
- § Avoid fruit juices and carbonated beverages

Monitoring Hydration Status

- § Use urine color chart - if color is 5 or greater rehydrate before allowing to practice
- § Measure urine specific gravity - < 1.020
- § Body weights daily before and after practice
- § Determine individual sweat rate for high risk individuals

Rest Breaks

Environmental Conditions

Work:Rest Ratios

- § Extreme/hazardous risk 1:1
- § High risk: 2:1 (*Dallas, Texas*)
- § Moderate risk: 3:1
- § Low risk: 4:1