

# SPORTS MEDICINE DEPARTMENT

*Dallas Independent School District*

(September 1986)

High School Athletics

## Exertional Heat Illness

### Guideline Handbook

- Guidelines: Early August/September Football Practice

- ØMonitoring Heat

- ØPractice Adjustments

- ØWeight Charts

- ØWater Breaks/Station

- ØPractice Sessions

- §NO Practices between 12n – 6pm

- §1st Day of School/1st Day of Practice

- §AM Only (one session)

- §Double AM Practice

- Warnings

- ØMedical Symptoms/Emergent Care

- ØTreatment

- ØObservation

- ØBe Smart

- ØCheck List

- Medical Information

- ØCommon Elements

- ØDefinitions

- ØRisk Factors

- ØMedical Conditions

- ØManagement of Care

- ØPrevention

# 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.

# Weight Charts

(1<sup>st</sup> 10 days of practice)

- § Weigh your athletes prior to practice and after practice.
- § 2% or > must be watched.
- § Must regain weight to the 2% or under to return to practice.

# 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.

# Water/Emergent Care Station

- § Cooling Tank, 1/2 filled with cool water
  - ü4 – Ten gallon water coolers, filled w/ice
- § Large Quantities of Ice and Cold Water
- § Circulating Fans
- § Misting Fans
- § Shade; the station must be shaded!

# 1<sup>st</sup> Day of Practice & 1<sup>st</sup> Day of School

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

- 1 ½ - 2 hour practices
- 2 ½ - 3 hour practice w/concessions
  - ü Solid conditioning history of athletes.
  - ü Increase water breaks and rest/recovery breaks
  - ü No post-practice conditioning.

# Practice sessions prior to the start of school

## AM practice only

- § Practices are 1 ½ to 2 hours in duration
- § Practice will not exceed 12n
- § Earlier the better. 7am is best
  - ü Humidity vs direct sun

# Double AM practices with a break:

- § First session should not exceed 2 hours.
- § Second session should not exceed 1 1/2 hours.
  
- § Break must be a minimum of one full hour.
- § Exceptions: The consideration to a shorter break = shorter second session.

# Double AM sessions

## Break Recommendations

- § Electrolyte fluids; the higher the sodium content the better. 10g sodium per day.
- § No solid food is recommended.
- § Watermelon; with salt
- § Rest in air conditioning environment; circulating fans are essential.

# Traditional 2 a days; AM/PM Practice Sessions

- § Early am; 8am - 10am range for a 2 hour practice.
- § Rest/recovery must be considered with relationship to PM practice.
- § PM start; No practice prior to 6pm without consideration to duration and intensity to the workout. Any practice prior to 6pm must be discussed with the Athletic Office.

# 2 a day Practice; AM/PM Rest/Recovery

§ Fluids

§ Rest; air conditioned environment.

§ Balance diet

§ Chicken soup; 890mg sodium per 10 oz

# 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
- § Ice the head and neck.
- § Cold environment; circulating fans.
- § Fluids
- § > than 30 minutes; call 911

# Observation:

- § Lumping; conditioned athlete vs non
  - § 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

# Out of the Box

## § Buddy System

§ Watchful eye; non-bias, not reluctant to speak up!

## § Varsity Scrimmage

§ Varsity scrimmage first; cool of the morning

§ Hydrate on the bus and while they wait.

§ Black jerseys, WHY?

# 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

# Heat Illness Check List

## 1. DISD Heat Illness Guidelines

- ü Sling Psychrometer w/documentation
- ü Water Breaks
- ü Scales/Weight Charts

## 2. Designated Water/Emergent Care Station

- ü Cooling Tank
  - w/ emergent ice: 4 x 10 gallon water coolers;
- ü Drinking Water: Water Coolers
  - w/chilled water
- ü Water Cows
- ü Misting Fans
- ü Ice towels/sponges
- ü Table; used to administer care to
  - an injured athlete
- ü Cups
- ü Water bottles
- ü Shade; Portable Tents or
  - Tree shades areas

## 3. No Practice: 12n – 6pm (Until school starts)

## 4. Physicals prior to participation

# 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