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

Revision 2007

Revision 2009

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

(1st 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, ½ filled with cool water
  - 4 – Ten gallon water coolers, filled w/ice
- Large Quantities of Ice and Cold Water
- Circulating Fans
- Misting Fans
- Shade; the station must be shaded!

1st Day of Practice & 1st 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.

AM or PM practices

(Practices prior to the start of school)

- Practices are not to exceed 3 hours in duration
- No post-practice conditioning with practices that exceed 2 ½ hours in duration.
- AM Practice sessions are not to exceed 12n
- PM practice sessions; Start time 6pm or after

Double AM practices

(Practices prior to the start of school)

- First sessions are not to exceed 2 hours.
- Second sessions are not to exceed 1 1/2 hours.
- No post-practice conditioning after the 2nd practice session.
- Practices sessions are not to exceed past 12n.

- Break must be a minimum of one full hour.

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 and PM Practice Sessions

(Practices prior to the start of school)

- A single practice session shall not exceed more than 3 hours in duration.
- Both practices shall not exceed a total of 5 hours.
- No post-practice conditioning for practice sessions that exceed 2 ½ hours.

Traditional 2 a days

AM and PM Practice Session

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 (> 104º) with neurologic changes.

Diagnosis of Heat Stroke

- Core temperature usually above 104ºF with mental status/neurologic changes
- Time above 106º 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

- Cooling Tank
  - Remove clothing and equipment
  - Cold water immersion (35-59 degrees F)
- Call 911
- If a Cooling Tank is not available
  - Apply ice and cold water to the athlete's head, face and torso and the rest of his body.

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 to14 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 (50º to 59ºF)
- 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