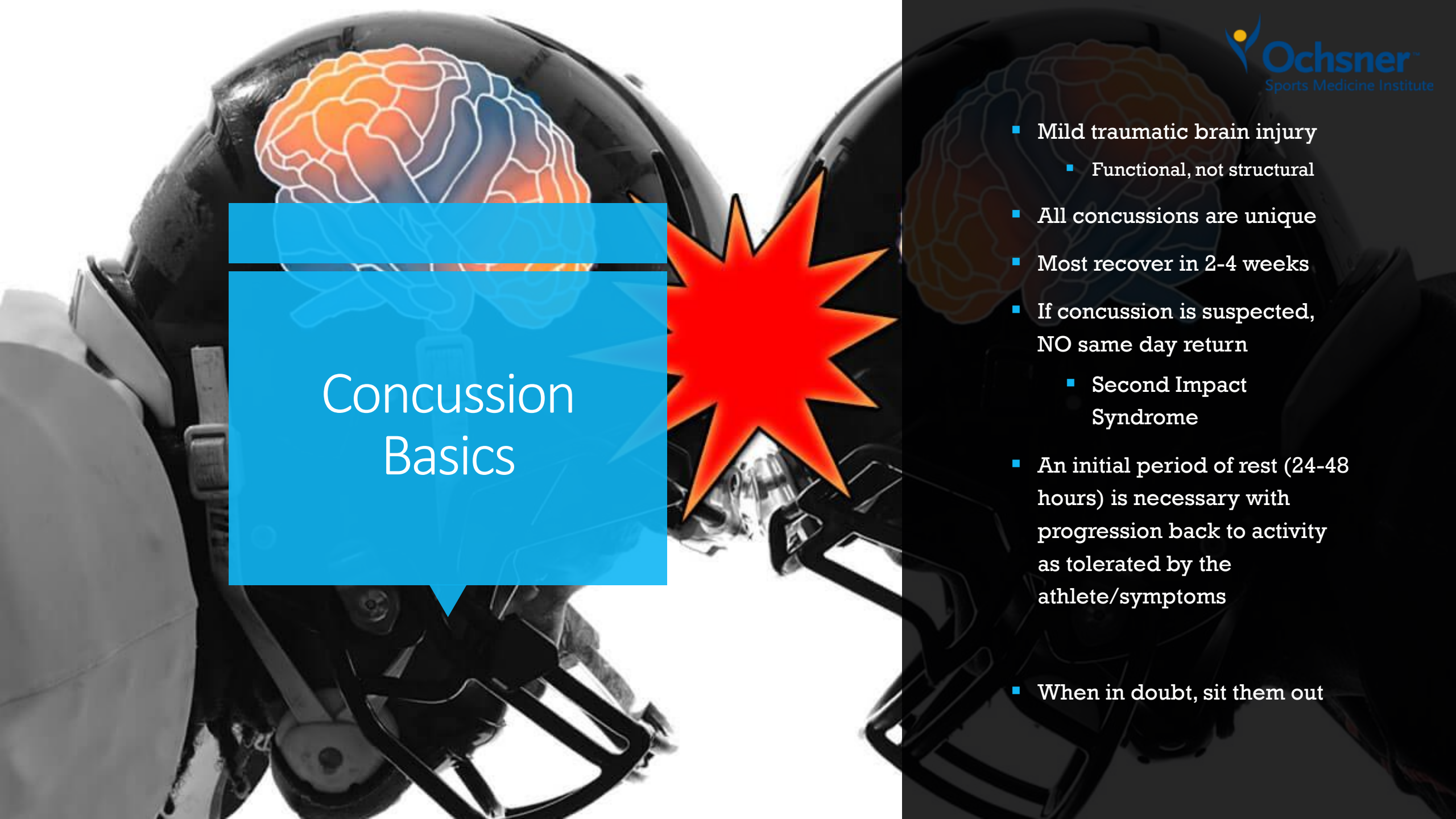
Head, Heat, & Heart: The 3 Hs - Education, Management, and Best Practice

David Leslie, DO

Primary Care Sports Medicine

Ochsner Sports Medicine Institute

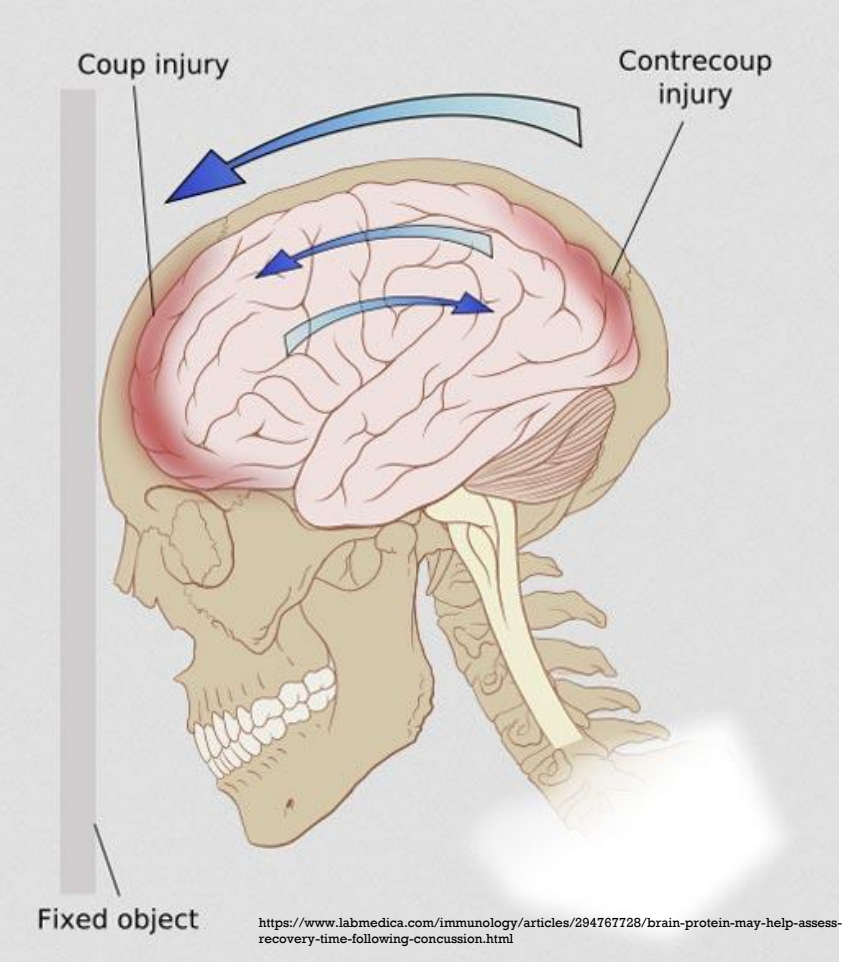


Concussion Basics

- Mild traumatic brain injury
  - Functional, not structural
- All concussions are unique
- Most recover in 2-4 weeks
- If concussion is suspected, NO same day return
  - Second Impact Syndrome
- An initial period of rest (24-48 hours) is necessary with progression back to activity as tolerated by the athlete/symptoms
- When in doubt, sit them out

Diagnosing Concussion

- Clinical Diagnosis
  - No imaging, labs say "positive for concussion"
- Based off symptoms, exam, MOI
  - SCAT 5
  - BESS (balance) testing
  - VOMS (eye) testing
  - Cognitive testing (ImPACT)
- Evolving injury



https://www.labmedica.com/immunology/articles/294767728/brain-protein-may-help-assess-recovery-time-following-concussion.html

Headache	0	1	2	3	4	5	6
"Pressure in head"	0	1	2	3	4	5	6
Neck Pain	0	1	2	3	4	5	6
Nausea or vomiting	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Blurred vision	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Sensitivity to light	0	1	2	3	4	5	6
Sensitivity to noise	0	1	2	3	4	5	6
Feeling slowed down	0	1	2	3	4	5	6
Feeling like "in a fog"	0	1	2	3	4	5	6
"Don't feel right"	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Fatigue or low energy	0	1	2	3	4	5	6
Confusion	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Trouble falling asleep	0	1	2	3	4	5	6
More emotional	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervous or Anxious	0	1	2	3	4	5	6

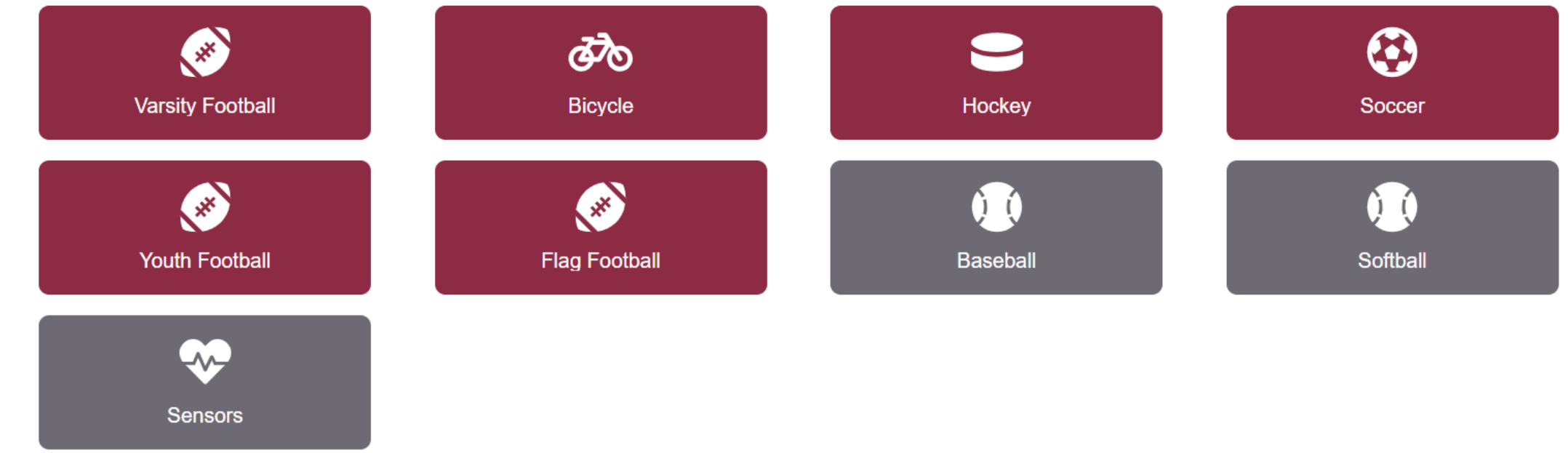
22 total symptoms, maximum score of 132

Concussion Symptoms

- Headache
- Neck pain
- Nausea/vomiting
- Sensitivity to light/sound
- Feeling slowed down
- Difficulty concentrating/remembering
- Irritability/sadness/anxious
- Dizziness
- Blurred vision
- Balance problem

Concussion (and complications) Prevention

Coaching	Equipment	Rule changes
• Technique • Culture	• Proper size, worn correctly • Helmets CANNOT prevent concussion	• Kickoffs • Penalties for dangerous hits



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Helmet Testing - Ratings

https://helmet.beam.vt.edu/

Ochsner Sports Medicine Institute Concussion Management

Baseline Concussion Testing

- Baseline data helps with return to play
  - Goal – get them back safely and quickly
- Some athletes will never be 0/22, 0/132
  - Want to get back to their "normal"
- BESS, VOMS
- ImPACT or similar (twice during HS career)

- **Tools that collectively help us decide**

Initial Concussion Management

- REST 24-48 hours
- Evaluation by concussion specialist
- Buffalo Treadmill Concussion
  - Need treadmill or bike with resistance
- Decision on whether they can begin RTP
  - Frequent and open discussion with ATCs
- Weekly follow ups

Return To Learn Protocol

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1221 S. Clearview Pkwy, New Orleans, LA 70121

504-736-4800

Return To Learn Protocol

1. Prepare to return to academic activities
    a. Begin ***light mental activity*** for short periods of time (about 15 minutes several times/day)
    b. Limit other mental/cognitive activities, especially those that worsen symptoms
        i. For example, computers, phones, video games
2. Begin light activity academics
    a. Return to class
        i. This may be a single class, or limited number of classes at first
        ii. See if a classmate can take notes while you work on paying attention
        iii. Change seating arrangement to limit distractions/stimulation
    b. Work on short/small assignments
        i. Work for short periods with rest in between
        ii. Avoid computer, if able, due to the risk of eye strain, headache, or neck tension
    c. Continue to limit problematic cognitive activities
        i. Computer, texting, watching TV, etc
3. Increase academic work load
    a. Return to more/all classes
        i. Begin taking notes
        ii. Work on major assignments, tests, and projects
4. Return to normal academic work load
    a. Return to ALL classes
    b. Arrange to take tests and complete missed work, if any

Return To Play Protocol

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Return To Play Protocol

Rehabilitation Stage	Functional Exercise at Each Stage of Rehabilitation	Objective of Each Stage
1. No Activity	Symptom limited physical and cognitive rest	Recovery
2. Light aerobic exercise	Walking, swimming, or stationary cycling keeping intensity <70% maximum permitted heart rate	Increase heart rate Perform for 30 minutes
3. Sport-specific exercise	Skating drills in hockey. Running drills in soccer. No head impact activities.	Add movement Perform for 30 minutes
4. Non-contact training drills	Progression to more complex training drills. For example, passing drills in football and soccer	Improve exercise, coordination, and increase cognitive load
5. Full contact practice	Following medical clearance participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6. Return to play	Normal game play	

If at any point concussion symptoms present or worsen, the player is to stop athletic activity and return to the prior step. Once the prior step is completed without symptoms, the player may progress to the next step to try and complete it again.

Athlete Return

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LHSAA Return to Competition Form

LHSAA rules require a written statement from a physician in order for an athlete to return to competition who apparently had a concussion.

"If a competitor is determined to have a concussion, he/she shall not be permitted to continue practice or competition the same day. Written approval of a physician shall be required for the athlete to return to competition. If a physician recommends an athlete not continue, he/she shall not be overruled".

The undersigned attending physician has examined the student athlete identified below and gives permission for the student athlete to return to competition on the date and in the sport identified.

ATHLETE: _____

SCHOOL: _____

SPORT: _____ *DATE of CONCUSSION* _____

ACTIVITY: _____ *DATE to RETURN* _____

Attending Physician Name (print) _____ LA Medical License _____

Attending Physician Signature _____ Date signed _____

Concussion Complications

Post concussion syndrome

- Symptoms lasting longer than the expected timeframe
  - Weeks? Months?
  - Depends on age
  - Frustration for students, parents, coaches
- Treatment based on symptoms that persist
  - Vestibular therapy
  - Counseling
  - Neurology

Second Impact Syndrome

- Rapid cerebral edema after a SECOND brain injury while a person is still symptomatic from a recent concussion
- Brain's blood supply regulation is lost
  - Increased ICP → brain herniation
- Commonly fatal (50%)
- Most common in high school and college-aged athletes

❖Recognized since early 1900's
- ➢Very small number of cases

❖Rare, progressive neurologic disorder – "tauopathy"

Chronic Traumatic Encephalopathy

Much remains unknown about CTE

- Correlation with concussion
- No defined number of hits

Retired NFL players with 3+ concussions:

- 5x increase in mild cognitive impairment
- 3x increase in memory impairment
- 3x more likely to have depression

Symptoms recognized decades after injury

Table 2
Clinical symptoms associated with chronic traumatic encephalopathy

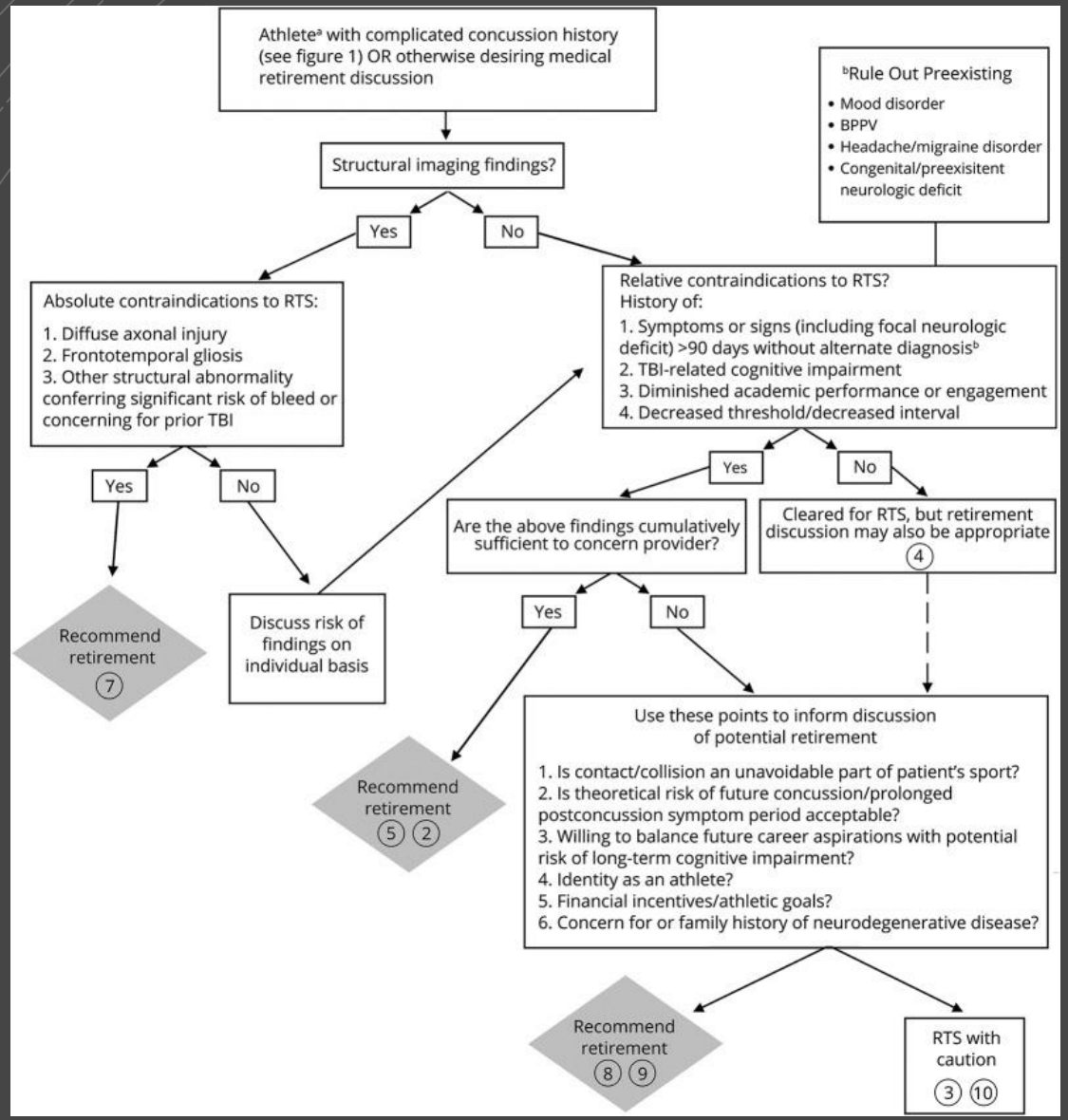
Cognitive	Mood	Behavioral	Neurologic
Memory deficits	Apathy	Poor impulse control	Dysarthria
Attention deficits	Depression	Substance abuse	Parkinsonian features
Executive function deficits	Suicidality	Violence	Chronic traumatic encephalomyelopathy

Kaufman MS, et al. *Phys Med Rehabil Clin N Am*. 2014, 25: 707-722

D'Hemecourt, P. CJSM 2011; 30: 63-72
McCrory, P. CJSM 2011; 21: 6-12
Guskiewicz, K, et al. Neurosurg 2005; 57: 719-726
Guskiewicz, K, et al. Med Sci Sports Exerc. 2007; 39: 903-909

Retirement From Sport

- Specific number of concussions has not been established – only expert opinion
- Repetitive concussions are associated with neuro-cognitive deficits
- Prolonged or unresolved post-concussion symptoms, permanent neurologic signs or symptoms, neuropsych testing that has not returned to baseline, or a report of decreased academic performance should not return to sports
- Red Flags:
  - Less force resulting in concussion
  - Longer recovery after concussion (>3 months)



Neurol Clin Pract. 2018 Feb; 8(1): 40–47.
doi: 10.1212/CPJ.0000000000000424

When To Send To The Hospital

- Examination findings suspicious for skull fracture
- Post-traumatic seizure
- Acute worsening of symptoms – may suggest bleed
  - Nausea/vomiting (>1 episode since injury)
  - Focal neurological deficit
  - Deteriorating Neurological Status: somnolence, slurred speech, difficulty walking, worsening mental status
- LOC or amnesia with history of bleeding/clotting disorder, dangerous mechanism of injury OR > 30 minutes of retrograde amnesia of events immediately before injury.
- If you're uncomfortable with the situation, defer to ATC or MD/DO

Head Conclusion

- Become comfortable with identifying the signs/symptoms of concussion
- Return to learn and play depends on each individual's injury → cannot compare to prior or other athletes
- When in doubt, sit them out

Heat

Why We Care

- Since 2000, 30 NCAA football players have died during conditioning
  - >1/year
  - Cardiac, heat, sickle cell anemia
- Over the last 30 years, 40+ high school athletes have died from heat related illness

National Center for Catastrophic Sport Injury Research at the University of North Carolina

Heat Illness:

What is it?

Imbalance of thermoregulation where heat production overwhelms the ability to get rid of it

Risk Factors for Heat Illness

- High environmental temperatures 
- Humidity 
- No sun coverage 
- No wind 
- Acute Illness
- Certain Medications
  - Anti-hypertensives, amphetamines, illicit drugs

Athlete Risk Factors

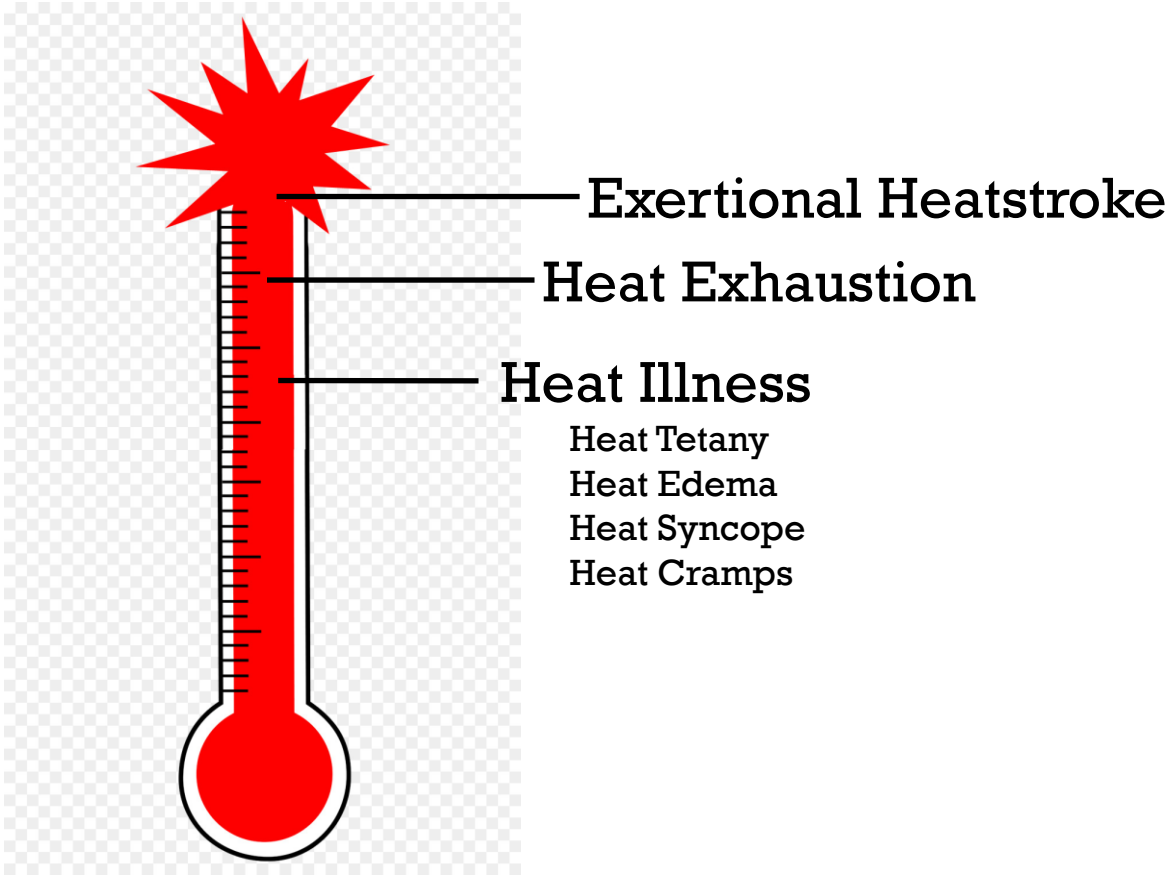
- Equipment, clothing
- Low fitness level
- Obesity, overweight
- Lack of sleep
- Lack of hydration
- Fever/illness

- Poor acclimatization
- Inappropriate work/rest ratios
- Prolonged exercise with minimal breaks
- Absence of Emergency Action Plan (EAP)
- Limited fluid breaks during training
- Delay in recognition of signs/symptoms
  - Lack of education for players, coaches, medical staff

Heat Related Disorders

- Heat Rash (Miliaria rubra)
- Swelling (heat edema)
- Sunburn
- Hyperventilation
- Muscle Cramping
- Syncope

Heat Illness Spectrum



Heat Illness

Heat Tetany

- Carpopedal spasm - short periods of intense heat stress
- Likely due to hyperventilation

Heat Cramps

- Wandering cramps in active muscles
  - Calves, quads, hamstrings
- Likely due to hyponatremia

Tetany and Cramps Treatment

- Remove from heat
- Decrease respiratory rate
- Replace fluids and electrolytes
- Stretch, massage
- Pickle juice? Mustard?

Heat Edema

- Swelling of hands, feet
- Generally self limited
- Most common in the lower extremities

HEAT SYNCOPE

Postural hypotension due to pooling of blood in lower extremities AFTER exercise

Decreased blood flow and oxygen to brain

- TREATMENT
  - Lay on back, elevate legs
  - Remove from hot environment
  - Oral, IV fluid replacement

Heat Exhaustion vs Exertional Heat Stroke

Heat Exhaustion

- Core temperature still less than 104º F
- Profuse sweating
- Headache, nausea
- Weakness, fatigue
- Confusion
- Difficulty concentrating
- Inability to continue to exercise

Exertional Heat Stroke

- Core temperature greater than or equal to 104°F
- Multiple organ system failure and/or CNS dysfunction
- **Hot, pale, dry skin**
- Disorientation or inappropriate behavior
- Headache
- Loss of balance

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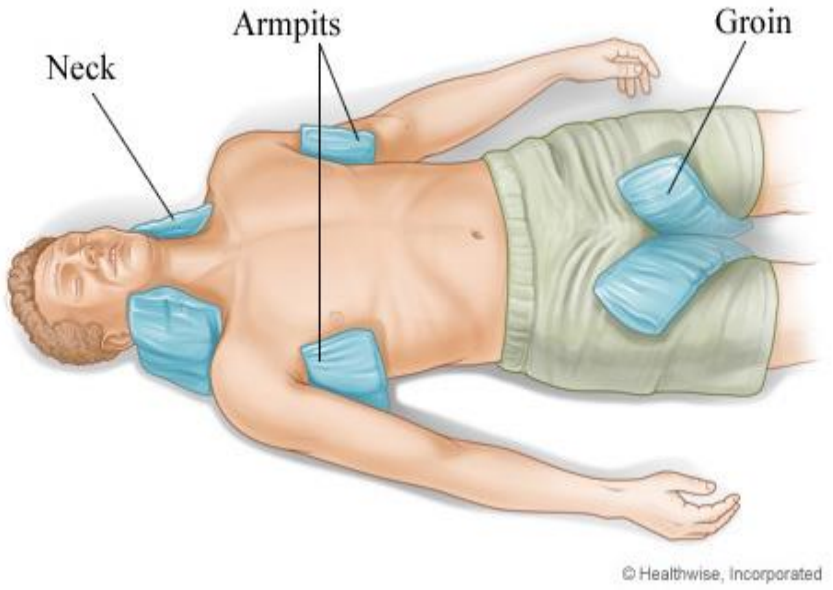
HEAT EXHAUSTION OR HEAT STROKE

HEAT EXHAUSTION	HEAT STROKE
Faint or dizzy	Throbbing headache
Excessive sweating	No sweating
Cool, clammy skin	Red, hot, dry skin
Nausea or vomiting	Nausea or vomiting
Rapid, weak pulse	Rapid, strong pulse
Muscle cramps	May lose consciousness

- Get to a cool shaded area or air-conditioned place
- Drink water if fully conscious
- Take a cool shower or use cold compresses

COUNTY OF BENTON

- **Call 9-1-1**
- Take immediate action to cool the victim by any means until help arrives (ice bath, cold towels, etc.)



Treatment
HEAT EXHAUSTION

Athlete needs to be taken to a cool, shaded area and elevate legs

Athlete should not return to play on same day

Oral fluid replacement

- Cool water (very cold may cause stomach cramping)

Rapid cooling measures

- COLD TUBS
- ICE PACKS
- Remove excess clothing

HEAT STROKE TREATMENT

- Remove all equipment and excess clothing
- Cool athlete ASAP (within 30 minutes)
  - Tub with ice and water – stir and add ice throughout the process
- If tub not available – shaded, cool area and rotate cold, wet towels
  - Cover as much of the body surface as possible
- After cooling – call 911
- Monitor vitals – rectal temp, HR, RR, BP, CNS
  - If rectal thermometer is not available – don't take a temp
  - Cease cooling when temp reaches 101-102
    - Allow EMS transport at this time

100% success rate if done within 10 minutes of collapse

Prevention of Heat Illness

- Exercise in early AM or evening
- Frequent breaks
- Adequate hydration and fluid replacement
  - Avoid caffeine and energy drinks
  - If you're thirsty, you're behind – start 2-4 hours before exercise
  - Drink on schedule – 8oz every 15-20 min
  - Small amounts frequently > large amounts rarely
- Monitor weight
- Appropriate clothing for conditions
- Acclimatization
- Limit or cancel exercise if in the "high risk" zone

ACSM HYDRATION GUIDELINES

- 1. Before exercise, make sure you are adequately hydrated:
  - a. Beverage consumption with meals will enhance fluid replacement and preexercise/event hydration.
  - b. Recovery from the previous exercise session should be 8 to 12 hours or more to enhance fluid replacement.
  - c. Tracking daily weight is helpful in evaluating hydration status because postexercise and day-to-day variations are likely from fluid loss.
  - d. Consider drinking 16 to 20 fluid oz 4 hours before exercise, especially if preexercise weight is reduced.

- 2. During exercise, drink according to your thirst sensation; no more or no less.
  - a. Drinking more than 800 mL per hour is not recommended and may increase the risk for developing dilutional hyponatremia.
  - b. During extreme weather conditions, fluid intake and pace may require additional adjustment.
  - c. For prolonged exercise, beverages containing 6% to 8% carbohydrate may provide additional benefit.

- 3. After exercise:
  - a. Drink 16 to 24 oz of fluid for every pound lost.
  - b. Postexercise meals should include fluid intake.

Exercise and Fluid Replacement: *Brought to you by the American College of Sports Medicine www.acsm.org*

Roy, Brad A. Ph.D., FACSM, FACHE

ACSM's Health & Fitness Journal: July/August 2013 - Volume 17 - Issue 4 - p 3

HEAT ACCLIMATIZATION

- Results in increased sweating and decreased energy expenditure with lower rise in body temp for a specific workload
- 1-2 hours of exercise daily
- Usually takes 10-14 days
  - Hot, wet environment takes longer than dry
- Will ultimately result in
  - Increases in skin vasodilation and sweating
  - Reduced core and skin temps
  - Improves fluid balance and cardiovascular stability
- Effects remain for about 2 weeks

Thermoregulation: From Basic Neuroscience to Clinical Neurology, Part II, Kenny GP et al. Handbook of Clinical Neurology. 2018

AREA OF PRACTICE MODIFICATION	PRACTICES 1-5		PRACTICES 6-14
	Days 1-2	Days 3-5	
# of Practices Permitted Per Day	1		2, only every other day
Equipment	Helmets only	Helmets & Shoulder Pads	Full Equipment
Maximum Duration of Single Practice Session	2 hours	3 hours	3 hours (a total maximum of 5 hours on double session days)
Permitted Walk Through Time (not included as practice time)	1 hour (but must be separated from practice for 3 continuous hours)		
Contact	No Contact	Contact only with blocking sleds/dummies	Full, 100% live contact drills

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Acclimatization Schedule

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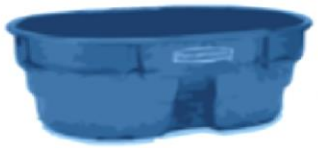
2 Heat-Safety Measures That Can Save Lives

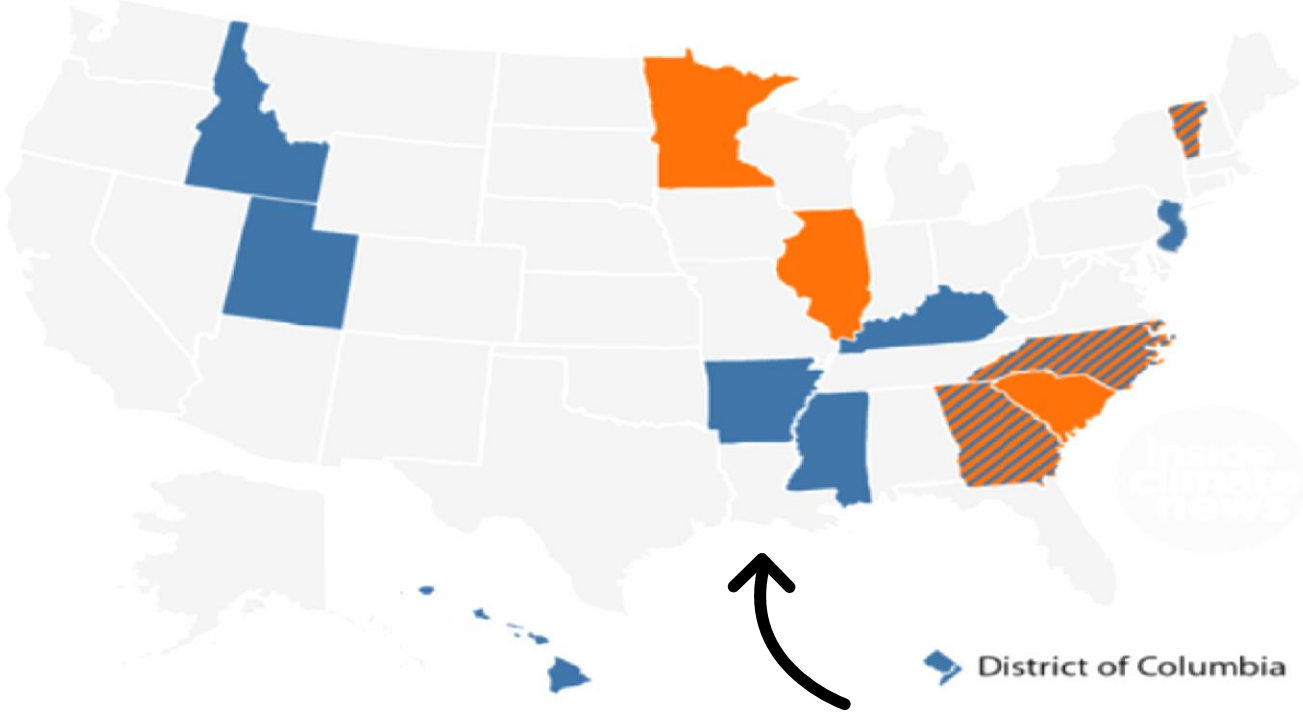
A few states now require cooling tubs at high school football practices for responding to emergencies and heat stress monitors to warn of dangerous conditions. The Korey Stringer Institute recommends both measures to save lives.



COOLING TUBS REQUIRED

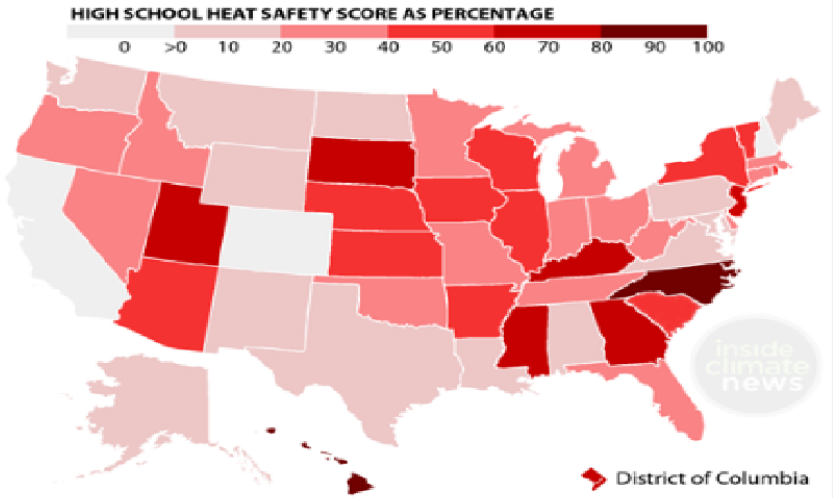
HEAT STRESS MONITORS REQUIRED

BOTH COOLING TUBS AND HEAT STRESS MONITORS REQUIRED



Which States Take Heat Risk Seriously for High School Sports?

The Korey Stringer Institute ranks states on high school football safety, including heat risks. The following scores are based on 19 heat safety measures, including requiring cooling tubs, heat stress monitors, air-conditioned practice breaks and policies for easing players into summer workouts and for responding if they show signs of heat stress. No state received the top score of 100 percent.



STATE	SCORE	STATE	SCORE	STATE	SCORE
North Carolina	93.8	New York	43.8	Oklahoma	22.5
Hawaii	85.6	Illinois	41.9	Alabama	20.0
New Jersey	78.1	South Carolina	41.9	Virginia	20.0
Utah	75.0	Florida	36.3	Montana	16.3
Georgia	71.9	Oregon	35.6	Wyoming	15.0
Kentucky	70.6	Tennessee	35.6	Maryland	13.1
Mississippi	66.3	Connecticut	35.0	Maine	12.5
D.C.	63.8	Massachusetts	35.0	Alaska	10.0
South Dakota	61.9	Missouri	35.0	Louisiana	10.0
Nebraska	58.8	Minnesota	33.8	North Dakota	10.0
Arkansas	58.1	Delaware	30.6	Pennsylvania	10.0
Kansas	53.8	Michigan	30.6	Texas	10.0
Vermont	51.9	West Virginia	30.6	Washington	10.0
Rhode Island	50.6	Indiana	30.0	New Mexico	9.4
Wisconsin	50.6	Nevada	30.0	California	0.0
Arizona	45.0	Ohio	25.6	Colorado	0.0
Iowa	45.0	Idaho	25.0	New Hampshire	0.0

SOURCE: Korey Stringer Institute

PAUL HORN / InsideClimate News

WET BULB GLOBE TEMPERATURE

- MEASURE OF HEAT STRESS IN DIRECT SUNLIGHT
  - TEMPERATURE
  - HUMIDITY
  - WIND SPEED
  - SUN ANGLE
  - CLOUD COVERAGE
- DIFFERS FROM HEAT INDEX
  - CALCULATED FOR SHADY AREAS
  - TEMPERATURE
  - HUMIDITY

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Wet Bulb Globe Temperature (WBGT) from Temperature and Relative Humidity

Relative Humidity (%) \ Temperature in Degrees Fahrenheit	68.0	71.6	75.2	78.8	82.4	86.0	89.6	93.2	96.8	100.4	104.0	107.6	111.2	114.8	118.4	122.0
0	58.6	60.9	64.3	65.5	67.7	69.9	72.1	74.3	76.4	78.5	80.6	82.6	84.7	86.6	88.6	90.5
5	59.6	62.1	65.6	67.0	69.3	71.7	74.0	76.4	78.6	80.9	83.1	85.3	87.5	89.9	92.1	94.2
10	60.7	63.3	66.9	68.4	70.8	73.3	75.8	78.2	80.7	83.0	85.5	88.0	90.3	92.8	95.1	97.6
15	61.7	64.5	68.1	69.6	72.2	74.8	77.4	80.0	82.6	85.2	87.8	90.2	92.8	95.4	98.0	
20	62.7	65.6	69.4	70.9	73.6	76.3	79.2	81.8	84.5	87.1	89.8	92.5	95.2	97.8		
25	63.8	66.7	70.5	72.2	75.1	77.8	80.6	83.4	86.2	89.0	91.8	94.6	97.4			
30	64.8	67.6	71.7	73.4	76.3	79.2	82.1	84.9	87.8	90.8	93.6	96.6	99.4			
35	65.6	68.6	72.7	74.6	77.5	80.5	83.5	86.4	89.4	92.4	95.3	98.3				
40	66.7	69.6	73.8	75.7	78.8	81.8	84.8	87.8	90.9	94.0	97.0					
45	67.5	70.6	74.8	76.8	79.9	83.0	86.1	89.2	92.3	95.4	98.6					
50	68.4	71.5	75.8	77.8	81.1	84.1	87.4	90.5	93.7	96.9						
55	69.3	72.4	76.7	78.8	82.1	85.3	88.5	91.9	95.1	98.3						
60	70.1	73.3	77.7	79.8	83.2	86.4	89.8	93.1	96.3	99.6						
65	70.9	73.8	78.6	80.9	84.2	87.5	90.8	94.1	97.5							
70	71.7	75.0	79.5	81.7	84.9	88.6	91.9	95.3	98.6							
75	72.4	75.9	80.3	82.7	86.1	89.6	92.9	96.4								
80	73.2	76.7	81.2	83.6	87.1	90.4	93.9	97.4								
85	74.0	77.4	82.0	84.5	88.0	91.5	94.9	98.5								
90	74.7	78.2	82.9	85.3	88.9	92.3	95.9	99.4								
95	75.5	78.9	83.6	86.1	89.6	93.2	96.8									
100	76.1	79.7	84.4	86.9	90.5	94.1	97.7									

NOTE: This chart is calculated using temperature and humidity, assuming a very clear sky (maximal solar load), and atmospheric pressure of 1ATA (760 mmHg). Chart A was developed by Professor Yoram Epstein to be used in Ariel's Checklist for hikers in Israel.

When the WBGT reading is >85.0°, cold-water immersion tubs or equivalent should be available to aid in the cooling process within the shaded area

WBGT	ACTIVITY GUIDELINES	REST BREAK GUIDELINES
Under 82.0°F	Normal Activities	Provide at least three separate rests breaks each hour with a minimum duration of 3 minutes each during the workout.
82.0-86.9°F	Use discretion for intense or prolonged exercise; watch at-risk players carefully.	Provide at least three separate rest breaks each hour with a minimum duration of 4 minutes each.
87.0-89.9°F	Maximum practice time is 2 hours. Players are restricted to helmet, shoulder pads, and shorts during practice, and all protective equipment must be removed during conditioning activities. If the WBGT rises to this level during practice, players may continue to work out wearing football pants without changing to shorts.	Provide at least four separate rest breaks each hour with a minimum duration of 4 minutes each.
90.0 - 92.0°F	Maximum practice time is 1 hour. No protective equipment may be worn during practice, and there may be no conditioning activities.	There must be 20 minutes of rest breaks distributed throughout the hour of practice.
Over 92.1°F	No outdoor workouts. Delay practice until a cooler WBGT level is reached.	

Korey String Institute, UCONN

Heat Conclusion

- Recognize the symptoms of heat exhaustion and stroke
- Acclimatization is essential
- Start hydrating early
- Cold water immersion saves lives

Heart

The day Denmark stood still: Christian Eriksen's collapse and the heroes who saved him

A Danish journalist recounts how it all unfolded – and what a country united in support of its team thinks of Uefa

▲ Christian Eriksen's teammates shield him from view as he is taken off the pitch by medical staff. Photograph: Wolfgang Rattay/EPA

A week ago Denmark's Christian Eriksen collapsed on the pitch during the Euro 2020 game against Finland, having suffered a cardiac arrest. His heart had stopped beating and, according to the Denmark team doctor Morten Boesen, he "was gone". This is the story about the heroes of Copenhagen and how Eriksen's life was saved – and what it meant for the nation.

Doctors say heart condition that led to Keyontae Johnson's collapse isn't COVID-related

Dan Wolken USA TODAY

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Table Causes of Common Cardiac Death in Young Athletes

Structurally Normal Heart	Structurally Abnormal Heart
Brugada syndrome	Hypertrophic cardiomyopathy
Long QT syndrome	Arrhythmogenic right ventricular cardiomyopathy
Catecholaminergic polymorphic ventricular tachycardia	Dilated cardiomyopathy
Commotio cordis	Left ventricular noncompaction
Other channelopathies	Congenital abnormalities of the coronary arteries
Electrolyte abnormalities	Marfan syndrome
Wolf Parkinson White syndrome	Valvular heart disease
	Myocarditis
	Coronary artery disease (athletes >35 years old)

https://www.acc.org/latest-in-cardiology/articles/2019/12/01/24/42/focus-on-ep-sudden-cardiac-death-in-athletes

Sudden Cardiac Death

Cardiac Examination

Most important part of the pre-participation physical

- Cardiac history (personal, family)
  - History of fainting/syncope?
  - Family history of sudden, early cardiac death?
- History of COVID-19 infection?
  - Additional cardiac clearance

Examination

- Heart auscultation
  - Any atypical sounds warrant further discussion and workup
- Pulses – wrist, ankle
- Blood pressure

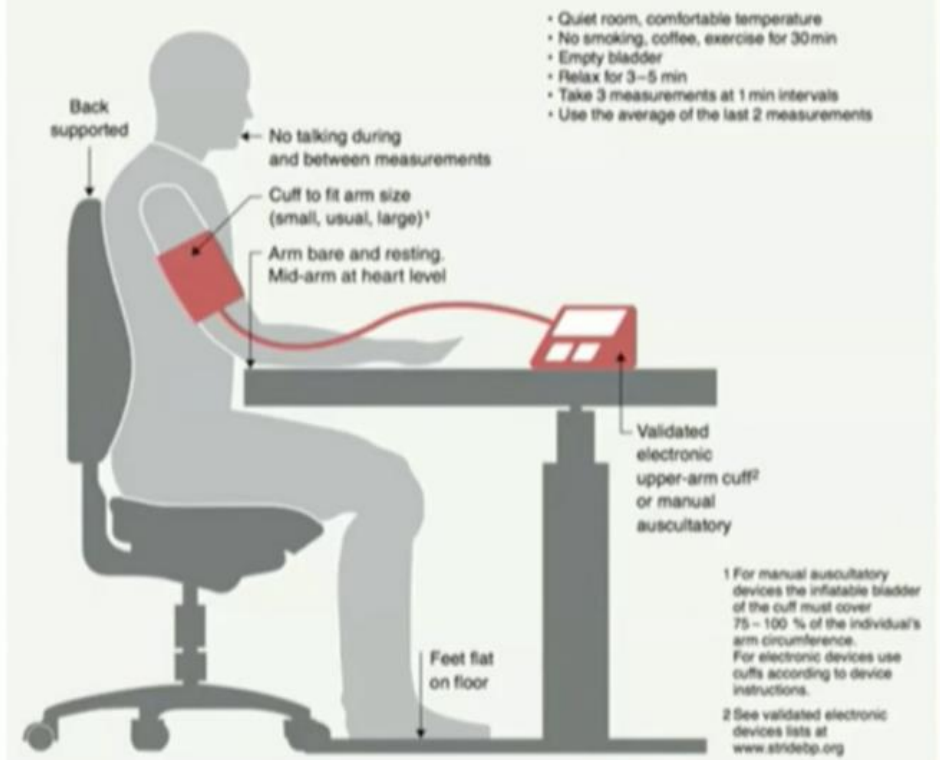
Blood Pressure

HYPERTENSION

- >130 / >80 now considered HTN
- Now "whitecoat HTN" requires more surveillance
  - Increased risk of heart attack and stroke
- Lifestyle modifications recommended first
  - Diet and exercise

OSMI BLOOD PRESSURE RECOMMENDATIONS

- <120/<80 - considered normal - CLEARED and no further action needed
- 120-129/<80 - considered elevated - CLEARED and no further action needed
- 130-179/80-119 - considered elevated - CLEARED and workup needed
- >180/120 or greater - hypertensive urgency or hypertensive emergency (if symptoms are present) - NOT cleared and they need a proper clinic work-up



STANDARDS FOR ACCURATE BP MEASUREMENT

- Automated machine, fidelity check at www.validateBP.org
- Consider leg BP measurement and brachial-femoral delay assessment
- 2-3 measures and average the values
- Wait an hour after exercise
- Confirm ≥ 2 occasions
- Home BP measurement (HBPM)

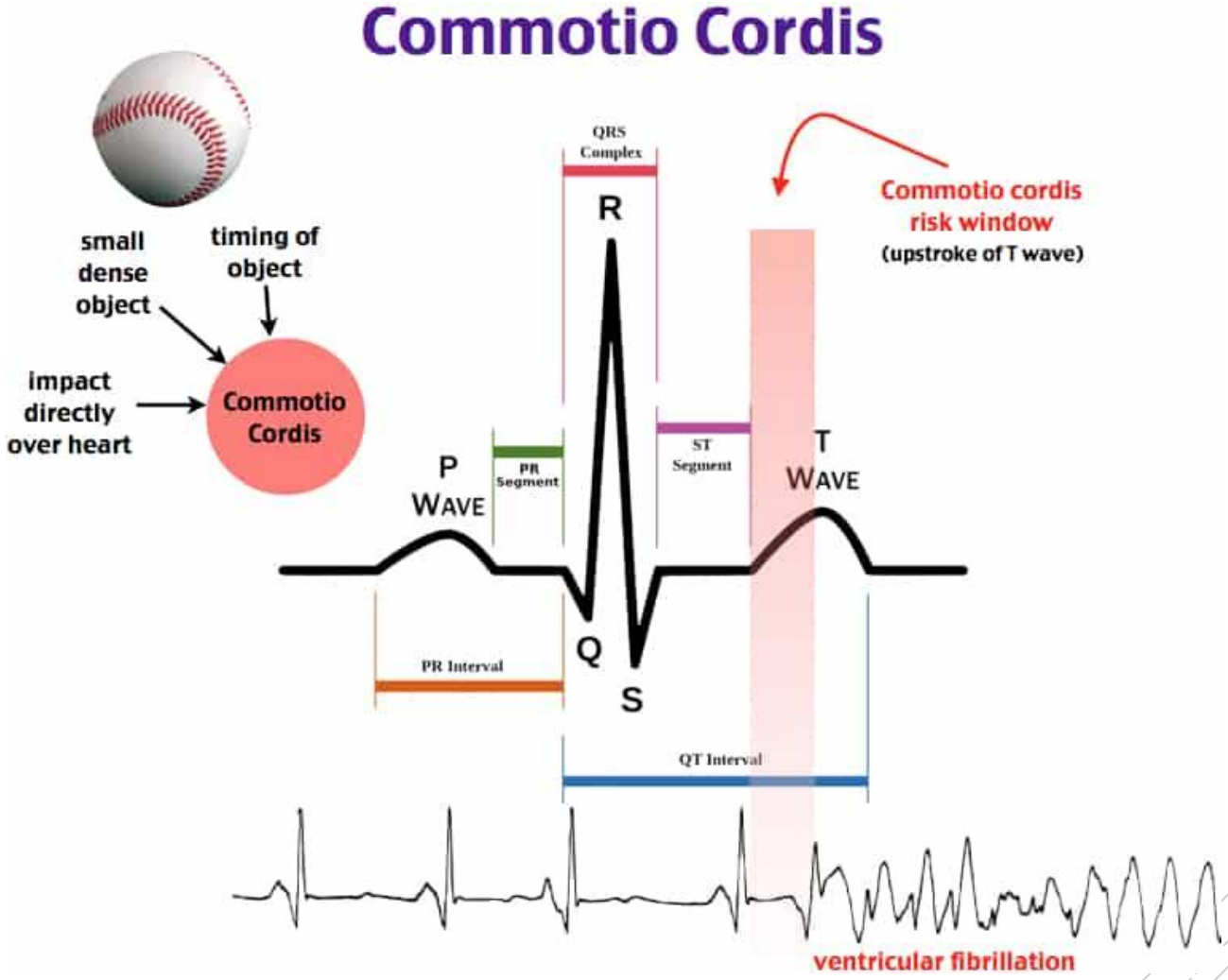
Thomas Unger. Hypertension. 2020 International Society of Hypertension Global Hypertension Practice Guidelines, Volume: 75, Issue: 6, Pages: 1334-1357

Commotio Cordis

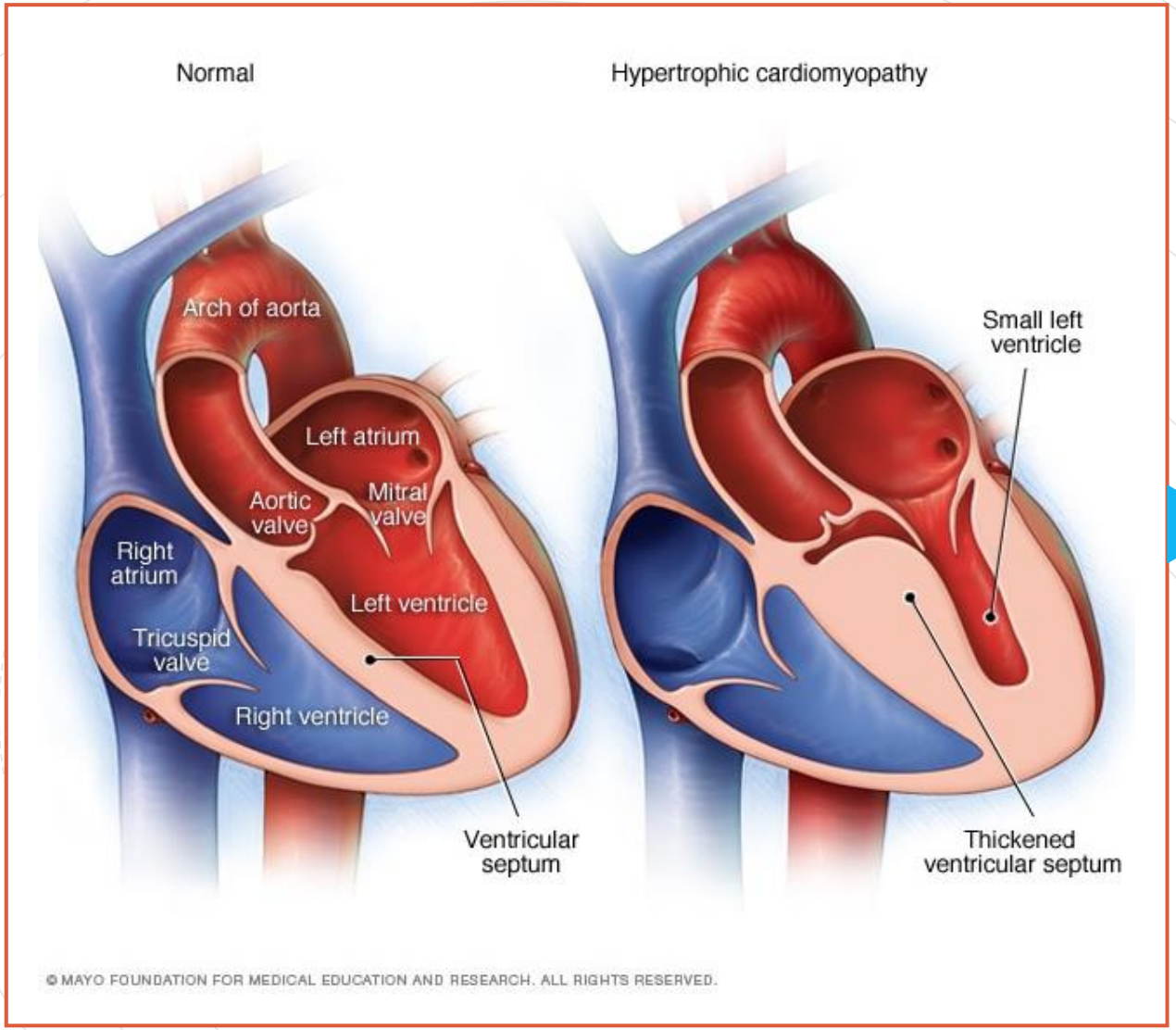
5-15 years old

Ventricular fibrillation – AED

35% chance of resuscitation



https://www.grepmed.com/images/5372/cordis-cardiac-sudden-pathophysiology-commotio



https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.mayoclinic.org%2Fdiseases-conditions%2Fhypertrophic-cardiomyopathy%2Fsymptoms-causes%2Fsyc-20350198&psig=AOvVaw1wAmIh5DqhokbPiHTtZgAz&ust=1626663755211000&source=images&cd=vfe&ved=0CAwQjhxqFwoTCPCZue3Q6_ECFQAAAAAdAAAAABAD

Hypertrophic Cardiomyopathy

Generally no symptoms

See a physician if they're experiencing chest pain with exertion, palpitations

Family history is important

Ochsner™
Sports Medicine Institute

Automated External Defibrillator

AED Facts

- Most effective within 3 minutes of arrest
  - Make sure it's close and ready to operate
  - Understand what steps to take
- Restart the heart, prevent brain damage
- If used before EMS arrives → 2.6x greater chance of survival
- Survival jumps to about 67% (CPR+AED) from 43% (no AED)
- EAPs important to review locations/access
  - Point person to get the device
    - Know what it looks like

Myocarditis & Pericarditis

Inflammation of/around the heart

Can be seen following viral infections

COVID-19 and myocarditis

- Rare complication post infection
- Extremely rare complication post vaccination
  - More common in boys, Moderna/Pfizer
  - Pfizer and Moderna – after second dose – within 2 weeks
- LHSAA clearance requirement
  - Can take up to 14 days for this complication to occur
  - LDH recommendation is to wait 14 days to return to full activity athletics
    - Out after 10 days (no symptoms) → clearance exam → PROGRESSION back to play

Treatment

- Rest, time → can take up to 6 months
  - Limit exercise activity due to the risk of arrhythmia

Conclusions

- Education and awareness is essential
- Athletic decisions should focus on the present and future
- Preparation, even if redundant, will make the difference
- This will never happen to you … until it does