Pre-participation Sports Physical

Learning Objectives
- Review the guidelines for pre-participation sports physical
- Understand the key things to identify in a medical history for a patient planning to participate in athletics

History of the PPE
- Initially suggested by Teddy Roosevelt in 1905
- Created 30 years ago, primarily to look at congenital heart disease
- American Heart Association first developed screening guidelines in 2007
- Most recent guideline from 2010 PPE 4th edition monograph

Benefits of the PPE
- >7.6 million athletes participated in high school sports in 2010-2011 academic year
- medical home
- updating of immunizations
- identification and management of chronic health conditions
- provision of anticipatory guidance related to sports
Benefits

- Facilitate and encourage safe participation, not to disqualify
- <2% of 2700 athletes screened disqualified
- 12% athletes required follow up
- Athletics are good for teens
  - Less likely to be truant
  - Less likely to get pregnant

Limitations of PPE

- Not necessarily effective screening tool
  - 310 studies of the PPE → “the evaluation likely does little to prevent morbidity and mortality in screened athletes; ineffective for identifying athletes at risk for sudden cardiac death or orthopedic injuries and at detecting exercise-induced bronchospasm”
- Inconsistencies between states (no standard)
- AHA guidelines are often not followed

It’s the Law

- National Federation of State High School Associations (NHFS) regards PPE as prerequisite to sports
- Liability issue
- High-school and middle-school athletes required to obtain signed every 1 to 2 academic years


- Approved by:
  - AAP
  - AAFP
  - American College of Sports Medicine
  - American Medical Society for Sports Medicine
  - American Orthopedic Society for Sports Medicine
  - American Osteopathic Academy of Sports Medicine
PPE 4th Edition 2010

Primary objectives:
- Screen for conditions that may be life-threatening or disabling
- Screen for conditions that may predispose to injury or illness (e.g., recurrent ankle/shoulder injury, obesity)

Secondary objectives:
- Determine general health
- Entry point to health care system
- Opportunity to initiate discussion of health-related topics

Recommendations for the PPE

Who does it?
- Preferably primary MD/DO with review of previous medical records
- Some states allow non-physician healthcare providers to perform PPE

When should you do it?
- At least 6 weeks prior to preseason practice
- Allows for strengthening/conditioning and identification of injury patterns and rehabilitation
- Periodicity is determined by state law
- AHA recommend q 2 years with annual updates to include history, height, weight, BP and a problem-focused exam

Recommendations for the PPE – Where?

Individual exam/office setting
- Privacy and continuity of care
- Costly
- Station approach
- Can be done for entire athletic team at once
- Time efficient
- Utilizes primary care providers and specialists
- Inexpensive
How should you do it?

- History alone detects >75% of problems
- Should be conducted with both athlete and parent
- Only 19-39% of athlete’s response match info from parent
- Include confidential information (HEADSS)

History - Cardiovascular

- Annual incidence of sudden cardiac death = 1/100,000 – 1/200,000 high school aged teens
- Previously asymptomatic
- Structural cardiac problems → fatal arrhythmias:
  - >90% sudden death in young athletes
  - 36% from hypertrophic cardiomyopathy
  - 8% from idiopathic LVH
  - 17% from coronary artery anomalies

PCP evaluation:
- Syncope
- Near-syncope
- Chest pain
- Palpitations
- Excessive shortness of breath

Cardiology referral:
- Known congenital heart disease
- Cardiac channelopathies
- History of myocarditis
- Coronary anomalies
### AHA Recommendations – History (8 points)

- Exertional chest pain/discomfort
- Exertional syncope or near-syncpe
- Excessive exertional and unexplained fatigue
- Prior recognition of heart murmur
- Elevated SBP
- Premature death (sudden) <50 y.o.
- Disability from heart disease in close relative <50 y.o.
- Family cardiac history

### AHA Recommendations – Physical Exam (4 points)

1. Heart murmur
2. Femoral pulses
3. Physical stigmata of Marfan syndrome
4. Brachial artery BP
   - Screening EKG not recommended
   - 1 or more positive responses may be enough to trigger a cardiology referral

### History - Musculoskeletal

- History is very sensitive for identifying abnormalities – 92%
- Ask about current injuries
- History of injuries that needed further evaluation

### Medications

- Current and past medications
- Therapeutic use exemption (TUE)
- Screen for illicit drugs
- Banned substances – college level
  - World Anti-Doping Agency
  - NCAA
History - Dermatologic
- Open wounds – cleaned and covered
- Sunblock usage
- Infectious
  - MRSA infections
  - Impetigo
  - Molluscum contagiosum
  - Tinea corporis
  - Herpes simplex

History - Neurologic
- Personal history of concussion
- Post-concussion symptoms
  - Symptomatic athlete should NEVER be allowed to return to play
- Neurocognitive testing (NCT) – controversial

History - Neurologic
- Cervical cord neuralgia – transient quadriplegia
  - Transient compression of cervical spinal cord from forced hyperextension, hyperflexion, or axial loading
  - Common in athletes with cervical spinal stenosis
  - Transient - <15 minutes
  - Controversial if should be allowed to play contact sports

History – Heat Illness
- Kills 1000 people each year in the U.S.
- Proper hydration
- Avoid stimulants and antihistamines
History - Ophthalmologic
- 20/40 best corrected vision – "functionally one-eyed"
- Eye protection recommended for all athletes by AAP and AAO
- Some sports do not allow eyewear, so need contact lenses
- Ultraviolet blocking eyewear for sun or snow sports

History - Pulmonary
- History of exercise-induced bronchospasm (EIB)
- Asthma is the most chronic illness in adolescents
- 10-79% of athletes (high school, college, Olympics) have EIB
- Athletes should have active prescription for bronchodilator

History – Infectious Diseases
- Mononucleosis and mono-like infection
  - Disqualified from participation any sport where risk for abdominal trauma
  - 3-4 week symptom free
  - Universal precautions

History - Genitourinary
- Solitary/horseshoe kidney – individual assessment
- Inguinal hernia – worsen with sports requiring high static demand
- Menstrual history: female athlete triad
  - Eating disorder
  - Menstrual dysfunction
  - Osteoporosis
Physical Exam
- Height
- Weight
- BMI: can be inaccurate
- Heart rate: Bradycardia, Wide pulse pressure

Physical Exam – Vital Signs
- Blood pressure:
  - 90-94% or 120/80 = pre-hypertension
  - >95% measured on 3 occasions = mild/moderate hypertension
  - >99% + 5mm Hg = severe hypertension
  - Higher risk for a catastrophic event, worse end organ damage

Physical Exam - HEENT
- Vision: better than 20/40 corrected
- Auricular cartilage damage: ear protection
- Nasal septum damage
- Dental caries

Physical Exam
- Neurologic exam
- Cardiovascular:
  - Not benign: cardiology referral
  - Genitourinary (males only):
    - Undescended/absent testicle
    - Only one functional testicle
    - History of groin pain
Physical Exam

- Dermatologic lesions

Musculoskeletal exam

- Low yield in asymptomatic athletes
- History 92% sensitive in detecting significant musculoskeletal injuries
- Refer if recurrent injury, joint instability, locking of joints, weakness, muscular atrophy

Classification of sports

- Contact – based on potential for injury from collision
- Strenuous/dynamic – put a larger load on LV
- Static exercise – dangerous for those with htn, L. heart obstruction, risk of aortic dissection
### CONTACT/COLLISION - LIMITED CONTACT - NON-CONTACT

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<th>Non-contact</th>
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<td>Boxing</td>
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<td>Baseball</td>
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### Determining Clearance

- **Must maintain confidentiality**

1. Cleared without restrictions
2. Cleared with recommendations
3. Not cleared, reconsider after further eval or treatment
4. Not cleared for certain or all sports

### Special Situations

#### Seizures
- Risk of seizure very low during competition
- Refer to state’s legal seizure-free interval to return to driving: 3-6 months
- Athletes with poorly controlled epilepsy benefit from exercise

- Avoid:
  - Archery
  - Power lifting
  - Riflery
  - Swimming

#### Down Syndrome
- Cervical spine instability - 30%
- Special Olympics requires C-spine films
- Prohibited from collision sports regardless
- If instability, no “neck-stressing” sports
- Diving
- Gymnastics
- Soccer
Determining Clearance – Special Situations

- Acute febrile illness
  - Fever puts them at risk for acute heat illness
  - Reduces maximal exercise capacity
- Type 1 Diabetes Mellitus
  - Monitor glucose: q 30 min during continuous exercise, 15 min after completion of exercise and at bedtime
  - Permitted to participate in any sport

When to Disqualify an Athlete from Sports Participation

- Pulmonary vascular disease with cyanosis or a hemodynamically significant right-to-left shunt
- Severe pulmonary stenosis (untreated)
- Severe aortic stenosis or regurgitation (untreated)
- Severe mitral stenosis or regurgitation (untreated)
- Any cardiomyopathy
- Vascular Ehlers-Danlos syndrome
- Coronary anomalies (especially anomalous coronary origins)
- Catecholaminergic polymorphic ventricular tachycardia
- Acute pericarditis
- Acute myocarditis
- Acute Kawasaki disease

Recommendations for vitamins and hydration

- Vitamins
  - 1300 mg calcium
  - 400-600 IU Vitamin D
- Hydration
  - Fluids 2-4 hr prior to activity (until urine is clear)
  - Every 15-20 minutes during activity
  - 16-24 hours after activity
  - <1 hour of exercise: water only
  - >1 hour of exercise: sports drinks

Sports Injury Prevention

- Time off
- Strengthen muscles
- Increase flexibility
- Use proper technique
- Take breaks
- Stop activity if there is pain
Sports injury prevention

Play safe

- Baseball/softball: avoid headfirst sliding
- Football: no spearing
- Hockey: no body checking

Wear the right gear

- Properly fit equipment
- Athletes should not assume they can do more dangerous activities

References

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- Metzl JD "Sports Medicine in the Pediatric Office." Multimedia Case-Based Text With Video AAP 2008
- http://pedsinreview.aappublications.org.laneproxy.stanford.edu/content/121/4/841.long