





**The
Preparticipation
Athletic
Evaluation**

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Presentation Objectives

- Review the current evidence related to the preparticipation examination (PPE).
- Understand the importance and sensitivity of the history elements of PPE in revealing conditions that could prohibit or alter sports participation.
- Identify the primary goal of sports physicals (PPE).
- Identify the most common reason for restriction from sports participation.
- Identify factors to consider when determining restriction or disqualification from a particular sport.
- Identify which conditions cause the majority of young athlete deaths.



Sports Physicals/Preparticipation Examination

- Goal of preparticipation examinations (PPE) is NOT to discourage or prevent participation in competitive sports
- Goal of sports physicals is to maintain the health and safety of the athlete/patient



Primary Objectives of Sports Physicals

Our goal as providers is to:

- Identify medical problems that place the athlete at risk for injury/illness
- Identify correctable problems that might impair athlete's ability to perform
- Help maintain health and safety of athlete
- Assess athlete's fitness level for specific sport
- Education athlete and parents re sports, injuries, exercise and other health-related issues
- Meet legal and insurance requirements.

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Secondary Objectives of Sports Physicals

- Provide an opportunity for interaction with a health care provider (this is often the only time the athlete will interact with a healthcare provider that year).
- Offer counseling on health-related issues, i.e. Tobacco/ETOH/drug use, driving safety, safe sex, weight control/nutrition

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Importance of Sports Participation

- Adolescents rank failure to make a team worse than:
 - Death of a close friend
 - Failure to pass a grade in school
 - Separation from parents

• Kung, M. (2008). Presentation from 33rd National Primary Care NP Symposium, July 13, 2008: Sports Physicals, Legal Implications of Qualifying and Disqualifying Student Athletes. Keystone, CO.

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Importance of Sports Participation

- Benefits of sports participation include:
 - Physical
 - Emotional
 - Social
 - Economic



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Size of Young Athlete Population

- Estimated to be more than 5 million competitive athletes at high school level each year
- More than 500,000 college athletes
- Difficult to obtain numbers of athletes in middle school and youth programs
- Total number of young athletes available for screening may be about 10 million each year



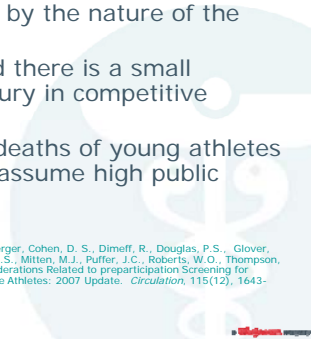
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Risk Tolerance

- Impossible to achieve zero risk in competitive sports by the nature of the activities
- Generally accepted there is a small inherent risk of injury in competitive sports
- However, sudden deaths of young athletes are tragic events, assume high public profile



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Deaths in Young Athletes

- Approximately 1:200,000/year in high school athletes
- Males at greater risk than females – 9:1 ratio
- 95% of these sudden deaths are due to structural cardiac problems

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Sudden Cardiac Deaths

- Hypertrophic cardiomyopathy is the most common cause of sudden cardiac death in young athletes – approx 1/3 of cases
- Coronary artery anomalies
- Myocarditis
- Marfan syndrome
- Arrhythmogenic right ventricular cardiomyopathy (ARVC)
- Long QT syndrome

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• Rice, S.G. & Council on Sports Medicine and Fitness. (2008). Medical Conditions Affecting Sports Participation. *Pediatrics*, 121(4), 841-6.



AHA Screening Recommendations 2007

- AHA 12 items for screening
 - 8 items for personal/family history
 - 4 items for physical examination
- Positive response/finding in 1 or more trigger cardiology referral

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AHA Screening Recommendations

Personal Hx

- Exertional CP/discomfort
- Syncope/near syncope
- Excessive exertional/unexplained dyspnea or fatigue
- Heart murmur
- Elevated BP

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AHA Screening Recommendations

• Family History

- Premature sudden death (<50 yrs age)
- Disability from CV disease (<50 yrs age)
- HCM, dilated cardiomyopathy, long QT, Marfan, clinically significant arrhythmias

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AHA Screening Recommendations

• Physical Exam

- Heart murmur
- Femoral vs radial pulses – exclude aortic coarctation
- Physical stigmata of Marfan syndrome
- Brachial artery BP (sitting)

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Incorporating AHA Recommendations

- Use screening form that includes the AHA history questions.
- Most state high school associations now have a sports physical or preparticipation examination form which includes AHA recommendations.
- This screening form should be completed by both the athlete and the parent/guardian with signatures from both.

• Ackerman, M.J., Balady, G., Barry J. M., Berger, Cohen, D. S., Dimeff, R., Douglas, P.S., Glover, D.W., Hutter, A.M., Krauss, M.D., Maron, M.S., Mitten, M.J., Puffer, J.C., Roberts, W.O., Thompson, P.D. (2007). Recommendations and Considerations Related to preparticipation Screening for Cardiovascular Abnormalities in Competitive Athletes: 2007 Update. *Circulation*, 115(12), 1643-1655.



Let's Review the History

- Personal Medical History including medications, allergies, medical conditions (see AHA recommendations for cardiac screening questions), steroid use, previous injuries/surgeries, eating disorders
- Family history including AHA screening questions,
- Social history including activities, smoking, ETOH, drug use, risky behaviors
- ROS for all systems (include AHA recommendations)

• Brennan, F.H., Deppenbrock, P.J., Giese, E.A., O'Connor, F.G., Orsiccio, R.G. (2007). The Athletic Preparticipation Evaluation: Cardiovascular Assessment. *American Family Physician*, 75(7), 1008-14



Physical Examination

- The physical examination starts with a complete set of vital signs: pulse, respirations, BP (refer to age, height, gender chart), temperature, height, weight, BMI
- Vision Screening
- General appearance



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PHYSICAL EXAMINATION

- HEENT
- Neck
- Respiratory
- Cardiac: Detailed in following slides
- Abdominal: BS, HSM
- Genitalia: testicular exam for hernia
- Neurological: reflexes, strength, coordination
- Musculoskeletal: Details to follow
- Skin: MRSA, contagious skin disease



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Cardiovascular Exam

- Screen for Marfan syndrome - if patient has **two or more** of the following findings, please refer for further evaluation:
- Height greater than 6'0" in men or 5'10" in women
- Kyphoscoliosis
- Pectus excavatum
- Arm span greater than height
- Myopia



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Cardiovascular Exam

- Auscultate with patient supine, standing and straining with Valsalva
- Some state high school association forms request a 15 hop activity followed by pulse rate immediately and then again at 2 minutes looking for recovery rate – also a good opportunity for auscultation after exercise
- Palpate the PMI for increased intensity and displacement that would suggest hypertrophy and possibly heart failure
- Evaluate femoral pulses for equality

• American College of Sports Medicine: Pre-participation Physical Exam brochure, 2002.
 • Barone, M.A., Gunn, V.L., Neehvasa, C., Johns Hopkins Hospital. (2002). *Harriet Lane Handbook: A Manual for Pediatric House Officers*. Baltimore, MD: CV Mosby.
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Musculoskeletal Exam

- Musculoskeletal findings are the primary reason for restriction from sports participation with the most common being knee injuries/rehabilitation
- The following slides walk through several maneuvers important to a comprehensive musculoskeletal exam

- American College of Sports Medicine: Pre-participation Physical Exam brochure, 2002.
- Barone, M.A., Gunn, V.L., Nechvba, C., Johns Hopkins Hospital. (2002). *Harriet Lane Handbook: A Manual for Pediatric House Officers*. Baltimore, MD: CV Mosby.
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Musculoskeletal Physical Examination

- Patient stands straight with arms at sides, facing examiner. Look for symmetry of upper and lower extremities and trunk and joints.
- Patient looks up to ceiling, down to floor; touches right and left ear to shoulder; looks over right and left shoulder. Should be able to touch chin to chest, ears to shoulders and look over shoulders equally.



- Barone, M.A., Gunn, V.L., Nechvba, C., Johns Hopkins Hospital. (2002). *Harriet Lane Handbook: A Manual for Pediatric House Officers*. Baltimore, MD: CV Mosby.



Musculoskeletal Physical Examination

- Patient stands in front of examiner with arms at side, pt. tries to shrug against resistance from examiner. Check for atrophy/weakness of shoulder muscles or nerve abnormalities.
- Patient holds arms out horizontally to sides and lifts (abducts shoulders) against resistance from examiner – look for equal strength in arms



- Barone, M.A., Gunn, V.L., Nechvba, C., Johns Hopkins Hospital. (2002). *Harriet Lane Handbook: A Manual for Pediatric House Officers*. Baltimore, MD: CV Mosby.



Musculoskeletal Physical Examination

- Patient holds arm out from side with elbow bent at 90 degrees – patient rotates shoulder to raise hand up with palms facing forward. Checking for loss of external rotation r/t shoulder problem



Barone, M.A., Gunn, V.L., Nechyba, C., Johns Hopkins Hospital. (2002). *Harriet Lane Handbook: A Manual for Pediatric house Officers*. Baltimore, MD: CV Mosby.

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Musculoskeletal Physical Examination

- Patient holds arms out from sides, palms up, flexes and extends elbows. Look for full ROM.



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Musculoskeletal Physical Examination

- Arms at sides, elbows bent at 90 degrees, then have patient twist palms up and down or pronate and supinate wrists. Checking for ROM, if lack of supination/pronation check for old injury of wrist, elbow, forearm.



Barone, M.A., Gunn, V.L., Nechyba, C., Johns Hopkins Hospital. (2002). *Harriet Lane Handbook: A Manual for Pediatric house Officers*. Baltimore, MD: CV Mosby.

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Musculoskeletal Physical Examination

- Have patient spread fingers, then make a fist. Look for ROM of hands/fingers as well as anatomic abnormalities indicative of fracture or sprain.
- Patient squats on heels, duck-walks four steps and stands up – should be painless, heel-to-buttock distance is equal bilaterally and knee flexion equal
- Patient bends forward with knees straight and touch toes – should be able to bend forward straightly and smoothly.

• American College of Sports Medicine: Pre-participation Physical Exam brochure, 2002.
• Barone, M.A., Gunn, V.L., Nechvba, C., Johns Hopkins Hospital. (2002). *Harriet Lane Handbook: A Manual for Pediatric house Officers*. Baltimore, MD: CV Mosby.
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Musculoskeletal Physical Examination

- Patient stands up straight with arms at sides and back to examiner. Look for symmetry of shoulders, waist, thighs and calves, checking for scoliosis.
- Patient stands on heels and rises up on toes – should be equal elevation on right and left sides, symmetry of calf muscles.

• American College of Sports Medicine: Pre-participation Physical Exam brochure, 2002.
• Barone, M.A., Gunn, V.L., Nechvba, C., Johns Hopkins Hospital. (2002). *Harriet Lane Handbook: A Manual for Pediatric house Officers*. Baltimore, MD: CV Mosby.
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How to Interpret Findings

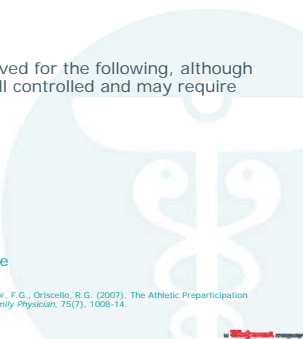

- Please use resources available in policy #TCNP062 – Sports Physicals
- Table 1 from American Academy of Pediatrics (2001) lists a classification of sports by contact
- Table 2 from American Academy of Pediatrics (2001) lists medical conditions and findings with recommendations about sports participation
- Cardiac findings on history and exam are summarized in on page 1010 of "The Athletic Preparticipation Evaluation: Cardiovascular Assessment" AAFP 2007.



Sports Participation Decision

- Some clear (temporary) disqualifications include:
 - Carditis
 - Fever
 - Moderate to Severe Diarrhea
- Participation may be approved for the following, although the condition should be well controlled and may require monitoring:
 - Diabetes mellitus
 - Hepatitis
 - HIV
 - Seizure disorder
 - Absence of one ovary
 - Asthma
 - Sickle cell trait
 - Undescended or absent testicle

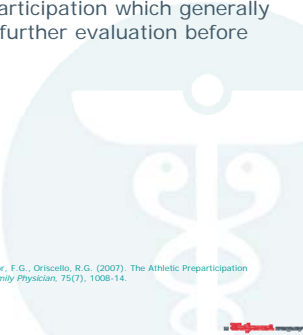

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Sports Participation Decision

- Numerous conditions receive a "qualified yes" recommendation for participation which generally indicates the need for further evaluation before participation:
 - Atlantoaxial instability
 - Bleeding disorder
 - Hypertension
 - Congenital heart disease
 - Heart murmur
 - Cerebral palsy
 - Eating disorders

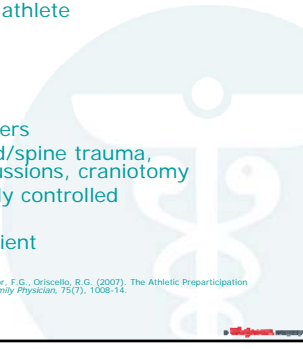

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Sports Participation Decision (cont'd)

- "qualified yes" cont'd:
 - Functionally one-eyed athlete
 - History of heat illness
 - Absence of one kidney
 - Enlarged liver
 - Malignant neoplasm
 - Musculoskeletal disorders
 - History of serious head/spine trauma, severe/repeated concussions, craniotomy
 - Seizure disorder, poorly controlled
 - Obesity
 - Organ transplant recipient

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Sports Participation Decision (cont'd)

- "qualified yes" cont'd:
- Pulmonary compromise (incl cystic fibrosis)
- Acute URI
- Sickle cell disease
- Skin disorders
- Enlarged spleen

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Factors to Consider Re Sports Participation

- For the majority of chronic health conditions, current evidence supports the participation of children and adolescents in most athletic activities.
- Consider these factors in decision-making:
- Risk of participation
- Advice of experts
- General health of athlete
- Level of competition
- Position played
- Strenuousness of sport selected

• Chandran, S., Kurovski, K. (2000). The Preparticipation Athletic Evaluation. *American Family Physician*, 61(9), 2683-90, 2696-8.



Factors to Consider Re Sports Participation

- Protective equipment
- Modifications for safer participation
- Efficacy of treatment/rehabilitation
- Understanding by parents and athlete regarding the risks of participation
- If pt has more than mild congenital heart disease or has a cardiac dysrhythmia, recommendations from 26th Bethesda Conference is to obtain a cardiology consult before clearance.

• Rice, S.G. & Council on Sports Medicine and Fitness. (2008). Medical Conditions Affecting Sports Participation. *Pediatrics*, 121(4), 841-6.



Additional Considerations

- When considering restriction/disqualification consider:
- Does problem place athlete at increased risk for injury/illness
- Is another participant at risk for illness/injury
- Can athlete safely participate with treatment
- Can limited participation be allowed while treatment is being completed
- If clearance is denied, what other activities can athlete safely participate in.

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• Take Care Policy #TCNP062. *Sports Physicals*. October 19, 2007. Take Care Health Systems.



Additional Considerations

- Avoid disqualification without reasonable or definitive evidence of disease.
- Remember, adolescents rank failure to make a team as worse than death of friend, failing grade, separation from parents.



Progress in Preparticipation Evaluations

- We have come a long way in providing consistent, reliable, cost-effective preparticipation evaluations for young athletes
- In 1997 40% of states had no formal screening requirement and/or standard state form met less than 4 of the 12 AHA recommended elements.
- In 2007 81% of states have adequate questionnaires.

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Conclusions

- Our goal as providers is to:
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- Identify correctable problems that might impair athlete's ability to perform
- Help maintain health and safety of athlete
- Assess athlete's fitness level for specific sport
- Education athlete and parents re sports, injuries, exercise and other health-related issues
- Meet legal and insurance requirements.

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- Questions?



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