# Common Issues Encountered in Adolescent Sports Medicine

## Guide to Completing the Preparticipation Physical Evaluation

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**KEYWORDS**

• Preparticipation physical evaluation • Sudden cardiac death • Concussion
• Musculoskeletal • Sports medicine • Adolescents

**KEY POINTS**

- The preparticipation physical evaluation is an essential tool used to screen adolescents for potential health risks associated with physical exertion.
- Cardiac screening with history and physical examination is often sufficient but diagnostic tests, such as ECG, can add additional, useful information if there are risk factors associated with sudden cardiac death (SCD).
- Concussion is an increasingly common injury in adolescents, so effective diagnosis and management are essential for primary care providers (PCPs).
- Musculoskeletal injuries are common among adolescents, specifically injuries of the shoulder, knee, and spine.

### INTRODUCTION

Participation in athletic activities among children and adolescents is on the rise in the United States. Approximately 35 million US children ages 5 to 18 play organized sports each year.[1] The Centers for Disease Control and Prevention estimates that high school athletes suffer approximately 2 million injuries per year, resulting in 500,000 doctor visits and 30,000 hospitalizations annually.[2] In addition to traumatic injuries, early specialization in sports has led to increased incidence of overuse injury in adolescents. Head injuries among adolescents are also on the rise. Emergency department

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visits for sports-related concussions in adolescents nearly doubled between 1997 and 2007,[3] likely secondary to increased participation in organized athletics as well as improved awareness surrounding concussion. Additionally, SCD is the leading cause of mortality in athletic young people, with an incidence in athletes ages 13 to 19 in the United States reported to be 0.35 per 100,000.[4]

Due to the quickly escalating patient volume, PCPs, regardless of training or interest in sports medicine, are called on to complete preparticipation evaluations (PPEs) and to see adolescents with acute injuries. PCP familiarity with concussion management, basic musculoskeletal injury care, and identification of dangerous cardiac conditions are essential to providing this service.

A majority of secondary schools in the United States require a PPE before allowing any child to participate in athletics. PPEs serve as the primary way to identify underlying medical conditions that may become dangerous during intense physical activity. PCPs should be aware that regardless of expertise level, they likely will be called on to clear athletes for participation and identify dangerous risk factors. Additionally, a PPE is often the initial gateway for adolescents to access the health care system without parental supervision. PCPs can use these physicals to discuss healthy lifestyle choices; review immunizations; screen for depression, anxiety, and drug use; or use other psychosocial screening tools.[5]

A complete PPE starts with a thorough history to screen for medical problems, medication use, past and familial cardiac conditions, history of concussions, and previous and current injuries. Physical examination components are included in **Table 1**.

### *Preparticipation Cardiac Screening*

A thorough history and physical examination can identify an athlete at risk for SCD. The most important aspects of a patient's history are personal and family cardiac history. Personal cardiac history includes previously identified heart murmur, hypertension, syncope, exertional chest pain or dyspnea, and previous cardiac testing. Significant family history includes unexplained or sudden death in individuals under 50 years of age. Unfortunately, this is often complicated by nonspecific complaints, incomplete or inaccurate history, and insidious onset of disease. Therefore, PCPs must pay special attention to history and physical examination findings, especially surrounding cardiac disease, and be prepared to look deeper into these issues if questions arise.

An American Heart Association consensus panel developed recommendations regarding history and physical examination findings that are most meaningful in identifying risk factors for SCD (**Box 1**).

Although athletes are encouraged to complete history forms prior to the PPE visit, this information is especially vital, so providers should take time to review these historical questions with patients and family members during a visit. Providers can quickly repeat questions involving previous symptoms (chest pain, shortness of breath, and so forth), previous cardiac testing or diagnosis, and family history of heart disease or any sudden death. Further screening questions include[6]

1. Have you ever passed out or nearly passed out during or after exercise?
2. Have you ever had pain, tightness, or pressure in your chest during exercise?
3. Does your heart ever race or skip beats during exercise?
4. Has a doctor ever told you that you have any heart problems?
5. Has a doctor ever ordered a test for your heart?
6. Do you get more tired or short of breath more quickly than your friends?