

Essential Sports Medicine

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*JH: I dedicate this book to my son Alex,
my wife Sandra, my parents, and my sister
Sacha, who have given me the love and
support to persevere and succeed.*

*GC: For Ana, my parents, Jason, Sharon,
Aaron, Cristina, and Robin.*

Preface

Sports medicine is a popular medical subspecialty. Several types of medical specialists participate, to a varying extent, in the care of sports medicine complaints. These include family practitioners, internists, physiatrists, orthopedists, neurologists, emergency room doctors, and neurosurgeons. While some doctors undergo formal training in a sports medicine fellowship, others simply try to adapt their musculoskeletal medicine training (which in some fields may be limited) to the care of patients with sports injuries.

Sports medicine certainly overlaps with general musculoskeletal medicine, but there are important differences of which to be aware. *Essential Sports Medicine* was created with this in mind. We believe that *Essential Sports Medicine* provides the highest yield, comprehensive, pertinent information about sports medicine so that the busy clinician can find it accessible and practical. We hope that medical students, residents, and fellows will also find *Essential Sports Medicine* useful for providing an accessible overview of the most salient points in the field of sports medicine.

As editors, we were fortunate to find many expert physicians ready and willing to contribute to this project. This book reflects their commitment to their work, and their dedication to teaching and their patients. We hope you find it as interesting and enjoyable to read as it was for us to create.

Joseph E. Herrera
Grant Cooper

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Chapter 1

Preparticipation Evaluation

Jennifer Kurz, Joseph E. Herrera, and Robert S. Gotlin

1 Introduction

The preparticipation evaluation (PPE) is a medical assessment of athletes performed prior to their participation in various types and levels of sports. It encompasses obtaining the athlete's medical history, performing a physical examination, and very importantly, identifying pertinent risk factors potentially prohibiting the athlete from sports participation, all of which guide the physician in making decisions about an athlete's safe participation in sports. There are three basic outcomes of the PPE: full clearance—without restriction, limited clearance, or no clearance. The decision about clearance is multifactorial and must be done with the best interest of the athlete in mind. The physician must be familiar with the basic category of sport in which the athlete is involved, whether it is a contact or collision sport, limited contact/collision sport, or a noncontact sport. Noncontact sports can be further characterized by their strenuousness.

2 Goals of a Preparticipation Evaluation

1. Ensure the player's safety.
2. Determine the player's individual level of fitness and health.
3. Ascertain the player's physical maturity and cardiovascular fitness, and identify pre-existing injuries and other pertinent medical conditions.
4. Document all risk factors, including family history, which may necessitate restriction of the athlete's participation in a particular sport.
5. Counsel the patient on various health risk behaviors and other health-related issues that may arise.

3 Timing of Preparticipation Evaluations

The frequency and timing of preparticipation evaluations vary slightly from state to state, but in general they are done annually. All states, including the District of Columbia, require physical exams prior to high school (and middle school) sports participation. A thorough evaluation is important before matriculating into a specific sport, whether at the elementary school, middle school, high school, college, or professional level. Annual re-evaluations thereafter often are less comprehensive if there are no changes in an athlete's health status. The initial PPE is usually performed 4 to 6 weeks before a new athletic season begins.

4 Cardiac Evaluation

The cardiac evaluation is an essential part of the PPE, but how extensive it should be is controversial.

Cardiovascular risk assessment has been the focus of much attention over the years because of the rare but highly publicized cases of "sudden death" syndromes, in which a seemingly strong and healthy young individual fatally collapses during or immediately after sports participation. The actual incidence of sudden death is very rare, 0.2 to 0.5 deaths per 100,000 adolescents per year. It is usually caused by structural heart defects in athletes under 30 years of age, or coronary artery disease in athletes over 30 years of age.

Cardiac screening of all athletes (including tests such as electrocardiograms, stress tests, and echocardiograms) for sudden death syndromes is thought by many to be cost prohibitive and not cost effective, due to the rather low yield of positive results. The decision whether or not a particular team or league performs extensive cardiac screening exams is widely individualized. The screening process should, however, begin by asking simple questions about personal and family risk factors (Table 1.1). If key risk factors are identified, further diagnostic tests and cardiology consultations are appropriate.

4.1 *Key Cardiovascular Risk Factors*

1. Family history of heart disease.
2. Persistent high blood pressure (upper limits of normal: 130/75 in children less than 10 years old, 140/85 in children over 10).
3. Smoking history.
4. High cholesterol (elevated serum total and LDL cholesterol and low serum HDL cholesterol).
5. Diabetes history.
6. History of cardiac symptoms: palpitations, dizziness/collapse, shortness of breath, or chest pain.

Table 1.1 Preparticipation physical evaluation

Name _____	Sex _____	Age _____	Date of Birth _____
Grade _____	School _____	Sport (s) _____	
Address _____		Phone _____	
Personal physician _____			
In case of emergency, contact			
Name _____	Relationship _____	Phone _____	

HISTORY

Explain “Yes” answers. Circle questions you don’t know answers to.

- 1. Have you had a medical illness or injury since your last check up or sports physical?
- 2. Do you have an ongoing or chronic illness?
- 3. Have you ever been hospitalized overnight?
- 4. Have you ever had surgery?
- 5. Are you taking prescription or nonprescription (over-the-counter) meds or pills or using an inhaler?
- 6. Do you take supplements of vitamins to gain/lose weight or improve performance?
- 7. Do you have allergies (i.e., pollen, medicine, food, and stinging insects)?
- 8. Have you ever had rashes or hives develop during or after exercise?
- 9. Have you ever passed out during exercise?
- 10. Have you ever been dizzy during or after exercise?
- 11. Have you ever had chest pain during or after exercise?
- 12. Do you get tired more quickly than your friends during exercise?
- 13. Have you ever had racing of your heart or skipped heartbeats?
- 14. Have you ever had high blood pressure or cholesterol?
- 15. Have you ever been told you have a heart murmur?
- 16. Has any family member or relative died of heart problems or of sudden death before age 50?
- 17. Have you had a severe viral infection (i.e., myocarditis or mononucleosis) within the last month?
- 18. Has a physician ever denied or restricted your participation in sports for any heart problems?
- 19. Do you have any current skin problems (i.e., itching, rashes, acne, warts, fungus, or blisters)?
- 20. Have you ever had a head injury or concussion?
- 21. Have you ever been knocked out, become unconscious, or lost your memory?
- 22. Have you ever had a seizure?
- 23. Do you have frequent or severe headaches? Have you ever had numbness or tingling in your arms, hands, legs, or feet?
- 24. Have you ever had a stinger, burner, or pinched nerve?
- 25. Have you ever become ill from exercising in the heat?
- 26. Do you cough, wheeze, or have trouble breathing during or after activity?
- 27. Do you have asthma?
- 28. Do you have seasonal allergies that require medical treatment?
- 29. Do you use any special protection or corrective equipment or devices that aren’t normally used?
- 30. Have you had any problems with your eyes or vision?
- 31. Do you wear glasses, contacts, or protective eyewear?
- 32. Have you ever had a sprain, strain, or swelling after injury?
- 33. Have you broken or fractured any bones or dislocated any joints?
- 34. Have you had any other problems with pain or swelling in muscles, tendons, bones, or joints?
- 35. *If yes, check appropriate box and explain below.*

- | | | |
|-----------|---------|-------|
| i. Head | Elbow | Hip |
| ii. Neck | Forearm | Thigh |
| iii. Back | Wrist | Knee |

iv. Chest	Hand	Shin/calf
v. Shoulder	Finger	Ankle
vi. Upper arm	Foot	

36. Do you want to weight more or less than you do now?
 37. Do you lose weight regularly to meet weight requirements for your sport?
 38. Do you feel stressed out?
 39. Record the dates of your most recent immunizations

i. Tetanus _____ Measles _____
 ii. Hepatitis B _____ Chickenpox _____

FEMALES ONLY

1. When was your first menstrual period?
2. When was your most recent period?
3. How much time do you usually have from the start of one period to the start of another?
4. How many periods have you had in the last year?
5. What was the longest time between periods in the last year?

PHYSICAL EXAM

Name _____ Date of birth _____
 Height _____ Weight _____ Pulse _____ BP _____
 Vision _____ R 20/ _____ L 20/ _____ Corrected: Y/N _____ Pupils: Equal _____ Unequal _____

Appearance: NI or ABN (Please explain all abnormalities below)

Eyes/Ears/Nose/Throat	Neck	Leg/ ankle
Lymph Nodes	Back	Foot
Pulses	Shoulder/arm	
Lungs	Elbow/forearm	
Abdomen	Wrist/hand	
Genitalia (males only)	Hip/thigh	
Skin	Knee	

CLEARANCE

- Cleared without restrictions
- Cleared after completing evaluation/ rehabilitation for:
- Not cleared for: Reason:

Recommendations _____

Name of physician _____

Address _____

Telephone _____ Fax _____

Signature of physician _____ MD/DO _____ Date _____

Sample preparticipation evaluation. Reprinted from American Academy of Family Physicians, American Academy of Pediatrics, American Medical Society for Sports Medicine, American Orthopaedic Society for Sports Medicine, American Osteopathic Academy of Sports Medicine, (1997) Preparticipation physical evaluation, 2nd edn. The Physician and Sports Medicine, McGraw-Hill, Minneapolis

4.2 Cardiac Contraindications for Sports Participation

1. Hypertrophic cardiomyopathy
2. Congenital coronary artery abnormalities
3. Severe pulmonic stenosis or aortic stenosis
4. Long QT syndromes
5. Active myocarditis or pericarditis
6. Marfan's syndrome

5 Pulmonary Evaluation

While evaluating the athlete for any wheezes or evidence of acute pulmonary infection, there are a few pulmonary conditions that require attention. Controlled asthma is not a contraindication for athletic participation. A physician's note, including documentation for the use of a hand-held inhaler is required for athletes with asthma. Most athletes with severe pulmonary compromise are discouraged from participating in high-intensity sports, while the majority are cleared for low-intensity sports participation (see Table 1.1).

5.1 Pulmonary Risks Factors for Sports Participation

1. Uncontrolled severe asthma (well-controlled asthma and exercise-induced asthma are not contraindicated)
2. Serious pulmonary infections (i.e., tuberculosis)
3. Conditions that compromise an athlete's respiratory status (i.e., cystic fibrosis or COPD)

6 Neurological Evaluation

Like the cardiac evaluation, a thorough history is important (refer to Table 1.2, Question 7). There are well-established guidelines for grading and managing concussions, both on and off the field. It is crucial to understand these guidelines in order to prevent serious brain injury such as "second impact" syndrome. Any loss of consciousness during contact/collision sports warrants immediate attention and neurological imaging. Temporary nerve root injuries or traction injuries to the brachial plexus results (i.e., "stingers" or "burners") usually resolve on their own. Persistent upper extremity numbness or weakness warrants cervical spine imaging.

Table 1.2 Common sports classifications

A. Classification of sports by contact		
Contact/collision	Limited contact	Noncontact
Basketball	Baseball	Aerobics
Boxing	Bicycling	Archery
Diving	Cheerleading	Badminton
Field hockey	Canoeing/kayaking	Body building
Football	Fencing	Bowling
Ice hockey	Field (high jump/pole vault)	Crew/rowing
Lacrosse	Gymnastics	Dancing
Martial arts	Handball	Golf
Rodeo	Horseback riding	Power/weight lifting
Rugby	Skating	Running/track
Ski jumping	Skiing	Sailing
Water polo	Softball	Swimming
Wrestling	Ultimate Frisbee	Tennis
	Squash/racquetball	
	Volleyball	
	Surfing	
B. Classification of sports by strenuousness		
Dynamic & static demands	Static demands	Dynamic demands
High to moderate intensity		
Boxing	Badminton	Archery
Crew/rowing	Baseball	Diving
Cross-country skiing	Basketball	Field events
Fencing	Lacrosse	Gymnastics
Football	Ping-pong	Martial arts
Ice hockey	Racquetball	Sailing
Rugby	Soccer	Ski jumping
Speed skating	Squash	Waterskiing
Water polo	Swimming	Weight lifting
Wrestling	Tennis	
Low intensity		
Bowling		
Cricket		
Golf		
Curling		
Riflery		

Adapted from American Academy of Pediatrics Committee on Sports Medicine and Fitness (1994) Medical conditions affecting sports participation. Pediatrics 94:391

6.1 Neurological Risk Factors

- 1. History of concussions
- 2. Traumatic brain injury
- 3. Seizures