

# Exercise-Induced Asthma and the Athlete: A Review For the Athletic Trainer

Patricia A. Aronson, ATC

**B**ronchial asthma has limited the physical activity of many asthmatic children and adolescents. Over-protective parents, overcautious physical educators, and misinformed teachers have contributed to this limitation (4,9,20). Asthmatic children may restrict themselves from activity if previously experienced distress has created fear and anxiety toward exercise (14,20). This is a medical-sociological consideration expressed by Linquist and Ahmad who state that children or young adults with EIA (exercise-induced asthma) should not be discouraged by parents or physicians from participating in sports and athletic events because of a past history of EIA, as the condition, once recognized, is often easily preventable with a proper prophylactic therapeutic program (16). The issue of asthma and exercise poses three considerations: (1) the ways in which parents, teachers, and coaches can be informed on the factors involved in EIA, (2) how an asthmatic attack is recognized, and (3) what can be done to aid a child during an attack. These three considerations will be the focus of this report on the implications of exercise-induced bronchial asthma to the athletic trainer.

## Athletic Trainers: Be Aware of Asthma

Bronchial asthma is a prevalent respiratory disease (4,5,9,14). It is the most chronic disease affecting children and it is approximated that 3% of children aged 6-16 years of age have asthma (9). The onset occurs before the age of 15 in 80% of male asthmatics and 40% of female asthmatics (4). Too many of these children are restricted from physical activity. This can be remedied by information sessions and programs conducted by school health personnel and/or the athletic trainer. By developing training sessions for parents and their children, teachers, and coaches, athletic trainers can educate those who directly affect asthmatics (that is, those who limit or restrict essential physical activity). This requires the trainer to be aware of and review the mechanics, symptoms, causes, and prevention of exercise-induced asthma as well as the treatment and care of the asthmatic child or adolescent.

Secondly, the athletic trainer should be informed on these asthma-related issues because many asthmatic adolescents do not allow this condition to restrict their activity in physical education classes or athletics (14). For many, medication controls their disease and reduces EIA incidents. Thirdly, some asthmatics are unaware of their condition because the manifestations of the disease have never presented themselves. In other words, they have never experienced a symptomatic attack. Trainers, especially those at the junior and senior high school setting, must be aware of the possibility of late-onset asthma.

---

*Ms. Aronson is an Athletic Trainer at the Federal Law Enforcement Training Center at Glynco, Georgia 31520.*

## BRONCHIAL ASTHMA

Bronchial asthma is subdivided into two categories: the extrinsic type and the intrinsic type. Extrinsic asthma, which is more prevalent in children and adolescents, is caused by an allergen such as dust, air pollution, pollen, specific foods, and, of particular interest to athletic trainers, exercise (4,5,13,19). Intrinsic asthma, which is more chronic and continuous in middleaged adults, has no determined cause. The asthmatic with extrinsic asthma usually will have a personal or family history of asthma. Those with intrinsic or late-onset asthma, often will not present a history of their condition (4,5,19). Once initiated, the asthmatic attack will continue with the same mechanical effects to the respiratory system where it is of the extrinsic or the intrinsic type of asthma.

## Mechanics

According to Stedman (21), the specific mechanical result of a bronchial asthma attack is a widespread narrowing of airways in the lungs. The narrowing is due in varying degrees to contraction (spasm) of smooth muscle, edema of the mucosa, and mucus in the lumen of the bronchi and bronchioles. This narrowing occurs for short periods of time either spontaneously or as a result of treatment. These changes are caused by the local release of spasmogens and vasoactive substances (that is, histamine or the slow-reacting substances of anaphylaxis) in the course of an allergic process. The described spasms of the smooth muscle lining the bronchi are an obstruction to the exchange of air and results in overinflation of the lungs and incomplete expiration. This mechanical reaction in the lungs produces the symptoms commonly experienced in an asthmatic attack.

## Symptoms

Incomplete expiration will create an audible, low pitched, wheeze and labored breathing, the two most common and frequently occurring symptoms of an asthmatic attack. These two symptoms can be accompanied by chest pain, rhoncus heard over the chest and at the mouth, and breathlessness and coughing due to increased mucus production.

Severe attacks compound these symptoms: a stridor (a harsh, high pitched sound) may be heard if the larynx is in spasm, wheezing may stop if constriction is severe (4,5) and choking may be caused by sputum discharge (22). Complications are also created if a respiratory tract infection is present at the onset of an attack (4,14). The inability to maintain the adequate oxygen level in circulation can lead to cyanosis. Anxiety or emotional stress during an attack can lead to further hyperventilation (4,16,20). Tachycardia is a dangerous complication of severe attacks (4,13). All of these symptoms will cause fatigue during and after the attack.

## EXERCISE-INDUCED ASTHMA (EIA)

### Mechanics

The two most discussed inducers of asthmatic attacks are allergens and exercise (17). Allergens affect only some asthmatics while EIA is a potential factor in all asthmatics whether they have the extrinsic or the intrinsic type of asthma (14,17). While the effects of allergens on the pulmonary mechanics are well established, the mechanical effects on the pulmonary system caused by exercise are still unsubstantiated and controversial theories (4,5,7,16,17,19). The mechanical changes in the bronchi are the same for both types of asthma but their cause is still in question.

### Symptoms

The symptoms specific to EIA usually occur after eight minutes of continuous exertion and within five minutes after completion of the exercise (4,5,16). Allergen-induced asthma will have a later reaction in the patient than EIA attacks (6). While breathlessness is a common occurrence during exercise, it is mild and constant in the healthy athlete. Breathlessness will be severe in the asthmatic both before and after exercise (16). An asthmatic will suffer chest pain or tightness with labored breathing. Wheezing will be audible. The posture of the athlete suffering from an attack will be a visible sign since sitting or leaning forward with fixed shoulders will aid the thoracic muscles in respiration. Another sign that athletic trainers can easily detect is the obvious protrusion of the veins in the neck and the heart pounding as the victim's heart rate increases (5,10-12).

With severe attacks, other difficulties can inhibit the athlete. Fractured ribs and respiratory complications may result from violent traumatic attacks. The chronic asthmatic child may experience stunted growth from frequent and severe attacks (4,5).

### First Aid

Parents, teachers, coaches, and athletic trainers should be aware of the emergency treatment for asthmatic attacks. Grant (10) offers the following instructions for the first-aider: asthmatic patients under a physician's care know what to do when an attack occurs. Thus, the EMT or athletic trainer should assist the patient in following his own instructions. The patient is helped in assuming a comfortable position, usually a seated or semi-seated position is best. Then help in taking whatever medication has been prescribed for the asthmatic is given. This will usually be an inhalant, pills, or a syrup. Administer oxygen if the patient is cyanotic. Comfort and reassurance for the patient is always recommended since tension and apprehension only worsen the asthmatic's condition.

Hafen (11) adds that keeping the victim warm, administering cough syrup to control the cough, and protecting the patient from emotional excitement will also be helpful first aid. Oxygen is available at many athletic events and should be administered to the athlete through the attack. In every case, it is emphasized that resting and calming the athlete is the essential treatment.

Not all asthmatics are under a physician's care. The late-onset type of asthma may become symptomatic at any time. For this reason, an asthmatic athlete's first attack may be in the athletic setting and physical educators, coaches, and athletic trainers must be aware of first aid treatments to help the athlete through this stressful and anxious experience.

### Prevention

Avoiding exercise is a preventative measure taken by

many asthmatics. Exercise does not have to be avoided. Recently it has been proven to aid asthmatics in the reduction of attacks occurring in their every day activities (18). There are many preventative measures that EIA sufferers can employ aside from the abstention from exercise.

The cause of an asthmatic attack will suggest its prevention. If a specific allergy induces attacks, then the antigen is to be avoided. In the sports realm this may indicate that swimming should be avoided if chlorine initiates attacks, or avoiding dusty and smokey areas (22). Since EIA is usually initiated after eight minutes of exertion, frequent rest periods during intermittent activities will be a preventative measure (11,21). Avoiding exercise when fatigued and/or ill is a preventative measure. Medication taken before activity has proven to be very effective in preventing EIA attacks. Selner summarizes that each asthmatic child must pick his activities carefully, avoiding those that easily provoke significant wheezing episodes. Asthmatics must recognize their own individual tolerance and limit for exercise, pace themselves properly, and rest when necessary (20).

Picking their activities suggests that certain sports induce EIA attacks more than other activities. Intermittent sports such as baseball, softball, ice hockey, sprints, and golf are less likely to affect an asthmatic. Endurance sports such as jogging, rowing, tennis, and soccer will predispose many asthmatics to an attack (1,8,14,16). Sports such as football, field hockey, and basketball vary in required aerobic activity according to the situation and position being played and will have varied affects.

Free running has the highest incidence of EIA while swimming has very few incidences. A theory becoming popular applies the temperature and humidity effects on the bronchi to explain the incidence factors in exercising (1-3,18). Cold air has an adverse effect on asthmatics during exercise. Due to variations in temperature and humidity in outdoor endurance sports, EIA attacks are more frequent in these conditions. Swimming, however, presents a warm and humid environment and is less likely to trigger an attack. Avoiding cold, dry, outdoor air is a common preventative measure. Many asthmatic runners and skiers have found that using a surgical mask or face covering (2,8,15) will prevent cold air from reaching the bronchi and triggering a reaction. The athletic trainer's kit should include a large bandanna or cloth to aid an EIA-susceptible athlete who is exposed to cold weather events.

### A Review of Medications

It is important for athletic trainers to be aware of medications that their athletes may be taking during their season of participation. Reviewing the effects of medications should be a routine practice for all trainers. It is common for asthmatics under a physician's care to use preventative medication. This may be in pill or aerosol form. Many pharmacological agents are not approved under doping tests (3,18). These are not common concerns for the athletic trainer in the high school setting but may be for the college trainer.

An asthmatic athlete's family physician will prescribe the patient's medication. However, the athletic trainer can administer an over-the-counter aerosol to a suffering athlete or aid the athlete who is under medication to take the medication. It is recommended that an aerosol approved by the team physician is carried in the athletic trainer's kit.

### Summary

Bronchial asthma is prevalent among children and adolescents, but the fear of EIA should not limit their

physical activity. Teachers, coaches, parents, and affected patients need to be aware of the pertinent information for the safety of the young asthmatic athlete. The athletic trainer in the junior and senior high school setting, in conjunction with the school's physician and health department, can provide this information.

Many asthmatics are participating in athletics today and may experience an EIA attack during activity. A background knowledge in the mechanics of bronchial disease, along with frequent reviewing of the signs and symptoms elicited during an attack, will aid the trainer in helping the athlete assist himself through the experience. Only by being aware of and reviewing the preventative measures, treatments, and other pertinent issues can the athletic trainer advise and aid the asthmatic athlete.

#### References

1. Block SH: Jogging and the onset of asthma. *New England Journal of Medicine* 298:1031-1032, May 1978.
2. Brenner AM, Weiser PC, Krogh LA, Loren MI: Effectiveness of a portable face mask in attenuating exercise-induced asthma. *Journal of the American Medical Association* 244:743-747, Oct. 6, 1972.
3. Busse WW: Exercise-induced asthma. *American Journal of Sports Medicine* 9(3):194-196, 1981.
4. Crofton J, Douglas A: *Respiratory Diseases*. Oxford, Blackwell Scientific Publ., 1975.
5. Crompton GK: *Diagnosis and Management of Respiratory Diseases*. Edinburgh, England, Clark Constable Ltd., 1980.
6. Dahl R, Henriksen JM: Development of late asthmatic reactions after allergen or exercise challenge tests. *European Journal of Respiratory Disease* 61:320-324, 1980.
7. Fitch D, Morton AR: Specificity of exercise in exercise-induced asthma. *British Medical Journal* 4:557-581, Dec. 4, 1971.
8. Fitch KD, Godfrey S: Asthma and athletic performance. *Journal of American Medical Association* 236:152-157, July 12, 1976.
9. Freudenberg N, Feldman CH, Clark NM: The impact of bronchial asthma on school attendance and performance. *Journal of School Health* 50:522-526, Nov. 1980.
10. Grant H, Murray R: *Emergency Care*. Bowie, Md., Robert J. Brady Co., 1971.
11. Hafen BQ: *First Aid for Health Emergencies*. 2nd Edition. St. Paul, West Publishing Co., 1981.
12. Henderson J: *Emergency Medical Guide*. New York, McGraw Hill, 1978.
13. Herxheimer H: *A Guide to Bronchial Asthma*. New York, Academic Press, 1975.
14. Katz RM: Asthmatics don't have to sit out of sports. *The Physician and Sportsmedicine* 4:45-52, April 1976.
15. Levin A: Prevention of exertion asthma. *New England Journal of Medicine* 299:201, 1978.
16. Lindquist CG, Ahmad M: Exercise-induced asthma. In *Occupational Asthma*. Edited by Frazier CA, New York: Van Nostrand Reinhold Co., 1980.
17. McFadden ER, Ingram RH: Exercise-induced asthma. Observations on the initial stimulus. *New England Journal of Medicine* 301:763-769, Oct. 4, 1979.
18. Morton AR, Fitch D, Hahn AG: Physical activity and the asthmatic. *The Physician and Sportsmedicine* 9(3):51-64, March 1981.
19. Saunders KB: *Clinical Physiology of the Lung*. Oxford, Blackwell Scientific Publ., 1977.
20. Selner JC: Parents' subjective evaluation of a self-help education-exercise program for asthmatic children and their parents. *The Journal of Asthma Research* 17:13-21, Oct. 1979.
21. *Stedman's Medical Dictionary*. 23rd edition. Baltimore, William and Wilkins Co., 1976, p. 133.
22. Strong WB: The uniqueness of the young athlete: medical considerations. *The American Journal of Sports Medicine* 8:372-376, Sept.-Oct. 1980. +

# COMPETITION® II

- Competition® II means low osmolality for better effectiveness.
- Competition® II is now available in original lemon-lime flavor and NEW fruit punch flavor.
- Competition® II is competition proven effective.

 **Mission**  
PHARMACAL COMPANY  
P.O. Box 1676 San Antonio, Texas 78236  
ATHLETIC PRODUCTS DIVISION