

# MEDICINE BALL TRAINING FOR KIDS:

## Benefits, Concerns, and Program Design Considerations

by Avery D. Faigenbaum, Ed.D., CSCS, FACSM and Patrick Mediate, Ed.M., CSCS

### LEARNING OBJECTIVE

- The primary learning objective is to review the potential benefits and concerns regarding medicine ball training for kids and to describe program design considerations for developing safe, effective, and enjoyable fitness programs for school-aged youth.

#### Key words:

Children, Resistance Training, Weight Training, Youth Fitness, Physical Activity

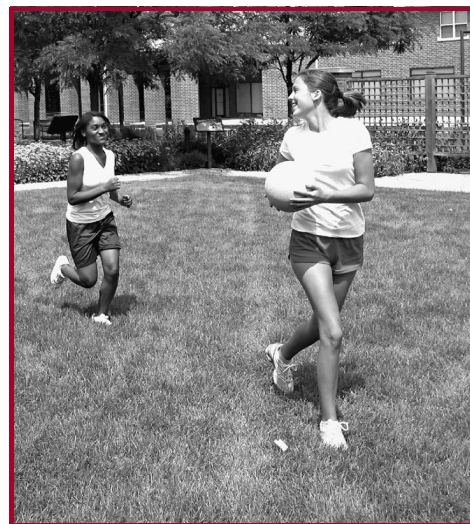
Children and adolescents need to participate regularly in physical activities that enhance and maintain cardiovascular and musculoskeletal health. Current recommendations indicate that school-aged youth should participate daily in 60 minutes or more of moderate-to-vigorous physical activity that is developmentally appropriate and enjoyable and involves a variety of activities (1). In addition to aerobic activities such as swimming and bicycling, resistance training also can be part of a health-enhancing physical activity program for school-aged children, provided that appropriate guidelines are followed (2,3). Whereas different modes of resistance training such as weight machines and free weights (*i.e.*, barbells and dumbbells) have proven to be safe and effective for children and adolescents (4), medicine balls are becoming increasingly more popular in schools, fitness centers, and sport training facilities.

Medicine balls were originally used in Europe in the 1920s for the rehabilitation of muscle function in older patients. A few years later, medicine balls became popular in the United States when White House physician

Admiral Joel Boone invented a game with medicine balls to keep President Hoover physically fit. The game was called *Hoover Ball* and was played with teams of two to four players who tossed a 6-lb medicine ball over a net 8 ft high on a court similar to volleyball. Nowadays, fitness professionals, youth sport coaches, and physical education teachers are rediscovering the many benefits that can be achieved by incorporating medicine ball training into youth fitness classes, personal training sessions, and sport programs.

Amidst public health concerns regarding childhood obesity and physical inactivity, the health club industry is getting more involved in the youth fitness market. According to the International Health, Racquet and Sportsclub Association (5), during the past 5 years, the number of members between the ages of 6 and 17 who joined a health club increased by 58% to 4.6 million. In addition, the YMCA of the USA reported that half of their 20.2 million

ACSM Photo/Lori Tish.



## Medicine Ball Training for Kids

members are younger than 18 years old (6). Clearly, a growing number of health clubs and YMCAs are now serving young members who need innovative, fun, and kid-friendly programs.

This article will describe the benefits and concerns associated with medicine ball training for kids and will provide an overview of our “Medicine Ball for All” youth program. Because quality youth programs should help boys and girls develop competence and confidence in their abilities to engage in different types of physical activity (7), fitness professionals who incorporate medicine ball training into kid-friendly classes and personal training sessions need to understand and genuinely appreciate the physical and psychosocial uniqueness of children and adolescents. Therefore, program design considerations for developing successful youth programs will be discussed.

### WHY MEDICINE BALL TRAINING?

Like other types of physical activity, regular participation in a medicine ball training program has the potential to positively influence many health and fitness measures. Medicine ball training can be used to enhance muscle strength, muscle power, coordination, agility, balance, and speed (8,9). In addition, because children’s heart rate response to medicine ball training is typically between 140 and 160 beats per minute (10), it is likely that this type of conditioning also can offer cardiovascular benefits such as an increase in aerobic fitness.

One of the most important benefits of medicine ball training is that it conditions the body to function as a unit instead of separate parts. Medicine balls provide a unique type of resistance that can be used for an unlimited number of exercises that can be performed at different movement speeds (from slow to explosive). For example, when you swing a baseball bat, you don’t think about each individual muscle but rather all the muscles involved in creating a fluid swing. It is the creation of these complex movements that mimic natural body positions and movement speeds that occur in daily life and game situations that make medicine ball training so valuable.

Photo courtesy of Avery Faigenbaum, Ed.D., CSCS, FACSM.

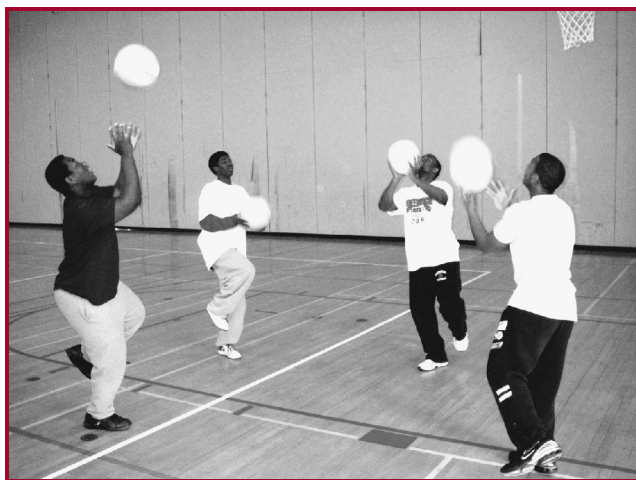


Photo courtesy of Avery Faigenbaum, Ed.D., CSCS, FACSM.



Medicine ball training also requires participants to use their mind and their body. Whereas some medicine ball exercises such as the chest pass are relatively easy to perform, others are complex and require children to think about what they are doing and how they are moving. For example, walking or jogging while moving a medicine ball in different directions requires participants to control their body position as various muscles work together to produce a specific movement. Through a constant interplay of imbalance and balance, this type of exercise can aid the body in controlling its center of gravity. How far can a child perform a walking lunge and still maintain dynamic balance if you add rotational and diagonal medicine ball movements? From our observations, this task-oriented approach to youth fitness programming can be enjoyable, challenging, and stimulating for children and adolescents.

Unlike other resistance exercises such as chin-ups and push-ups that may be too challenging for some youth who are sedentary or overweight, medicine ball training can be used to spark an interest in physical activity in boys and girls who are not prepared for the demands of vigorous fitness workouts or competitive sports programs. Indeed, medicine ball exercises that involve throwing, catching, and rotational movements can be structured in a way that is appropriate for all youth regardless of body size or fitness level. Thus, regular participation in a youth



fitness class or personal training session that includes medicine ball training can provide a solid foundation for future participation in more demanding recreational and athletic activities.

### RISKS AND CONCERNS

The belief that medicine ball training is old fashioned or unsafe for school-aged youth is not consistent with the popularity of medicine ball training or the documented risks associated with this type of exercise. There is no scientific evidence to suggest that the risks and concerns associated with appropriately prescribed resistance training programs are greater than those of other sports and recreational activities in which children regularly participate (8,11). Even if a child drops a medicine ball on his foot, an injury is not likely. Paradoxically, the sport-specific forces placed upon the joints of young athletes may be greater both in magnitude and duration than those resulting from medicine ball training.

Nevertheless, medicine training programs must be competently supervised, properly instructed, and sensibly progressed. Fitness professionals must be aware of the inherent risk associated with any type of resistance exercise and should attempt to decrease this risk by following established training guidelines. It is important to keep in mind that boys and girls should learn how to exercise with medicine balls from qualified fitness professionals who understand the physical and psychological uniqueness of children and adolescents. Thus, young participants should not be treated as miniature adults, and youth fitness programs should be consistent with the needs, interests, and abilities of each child. An advanced medicine ball training program for a young athlete would be inappropriate for a sedentary child who should be given an opportunity to experience the mere enjoyment of medicine ball training. In any case, it is always better to underestimate the physical abilities of a child rather than overestimate them and risk negative consequences such as dropout or injury.

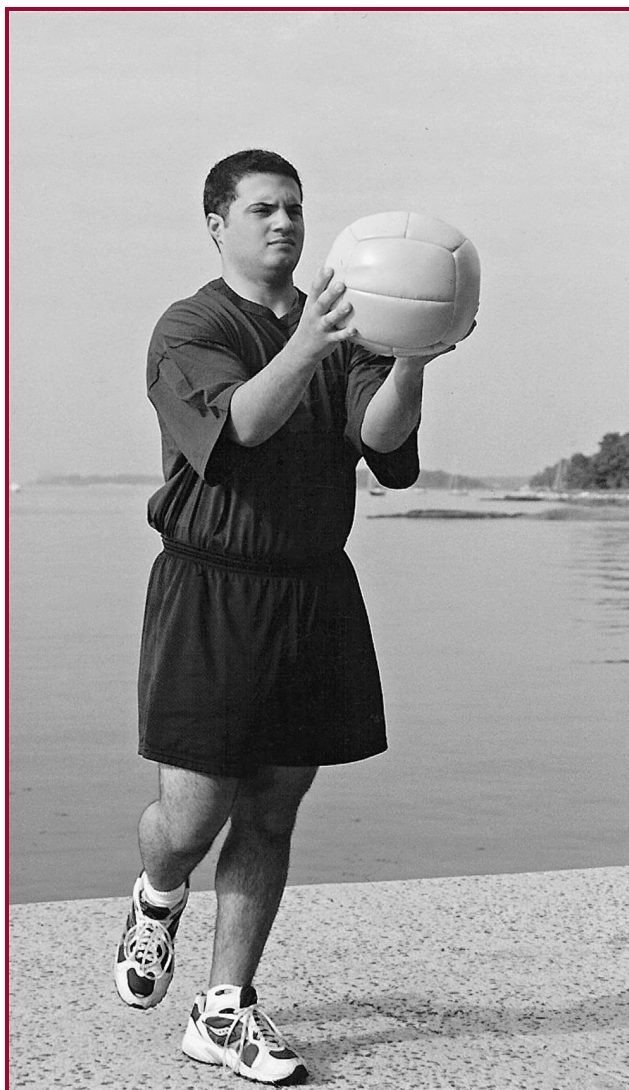
### GENERAL PROGRAM DESIGN CONSIDERATIONS

Although children and adolescents are physically active like adults, they are active in different ways and for different

ACSM Photo/Lori Tish.



Photo courtesy of Patrick Mediate, Ed.M., CSCS.



reasons. Watching children on a playground supports the premise that youth are active in short bursts of physical activity followed by periods of rest and recovery (12). As such, fitness professionals who work with youth should appreciate the natural activity pattern of children and adolescents and should not expect youngsters to maintain a given exercise intensity at a predetermined percentage of their predicted maximum heart rate for a prolonged period. Prescribing a program that is inconsistent with a child's needs or abilities will likely undermine the enjoyment of the training experience. Because enjoyment has been shown to mediate the effects of youth physical activity programs (13), the importance of creating an enjoyable exercise experience for all participants should not be overlooked.

Although there is no minimum age for participating in a medicine ball training program, children should have the emotional maturity to accept and follow directions and should appreciate the benefits and concerns associated with this mode of exercise. In general, most 7- and 8-year-old children are

## Medicine Ball Training for Kids

Photo courtesy of Patrick Mediate, Ed.M., CSCS.

ready and able for participation in some type of resistance training. It has been recommended that children engage in resistance training activities 2 or 3 days per week on nonconsecutive days and perform a variety of exercises that focus on the major muscle groups (8). However, when beginning a medicine ball training program, performing simple exercises and gradually progressing to more complex exercises will not only allow for positive changes in fitness performance but also will provide an opportunity for participants to gain confidence in their abilities before progressing to more advanced levels.

Fitness professionals should take the time before every class to be sure that the exercise environment is safe, well lit, and clean. Children need to follow directions (*e.g.*, look at your partner and keep hands open in the ready position), and they need to understand the benefits and risks associated with resistance exercise. Because medicine ball training does require more skill and coordination than exercising on weight machines, fitness professionals need to give proper demonstrations, clear instructions, and constructive feedback when necessary. Furthermore, professionals should try to make participation in fitness activities a positive experience for all youth. Examples of negative behaviors include forcing a child to participate in a fitness program, not speaking to a child after he or she performed poorly, or punishing a child for not playing well. Name calling, rejecting, ignoring, and simply saying things that hurt are damaging to a youngster's self-esteem and value as a person. Suggestions for working with children and adolescents are in Table 1.

Medicine balls come in a variety of weights (from 1 kg to more than 10 kg), so each child can start at a safe level and gradually progress as needed. In addition, some medicine balls have a textured surface or handle for easier gripping, and others are inflatable and bounce. Leather balls do not bounce but can be used as a base to stand on for balance training. Whereas college athletes may use relatively heavy medicine balls (*e.g.*, 5 to 10 kg) for training, we suggest that children begin with 1-kg balls and adolescents begin with 2- or 3-kg balls to learn proper form and technique of each exercise. In our youth programs,

**TABLE 1: Tips for Teaching Kids**

1. Explain safety rules to kids and their parents.
2. Be a positive role model by showing respect and courtesy.
3. Encourage kids to ask questions and address all of their concerns.
4. Keep instructions short and simple.
5. Emphasize the development of fundamental fitness abilities.
6. Use a variety of games and activities.
7. Create a program in which kids experience success.
8. Teach kids that it takes time to learn a new skill.
9. Recognize individual needs and capabilities of all participants.
10. Focus on intrinsic factors such as skill improvement, personal success, and having fun.



we use color-coded balls, so the instructors and the participants can easily keep track of the loads they are using. Obviously, it is desirable to have medicine balls of different weights and sizes to accommodate the needs and abilities of all participants. Medicine balls are relatively inexpensive (approximately \$15 to \$40 each, depending on weight and material) and are readily available from most sporting goods stores and athletic equipment companies.

### OUR “MEDICINE BALL FOR ALL” PROGRAM

Several years ago, students at our high school performed poorly on standardized physical fitness tests, and this school was ranked in the bottom half of all high schools in the state. In response to these unsatisfactory test results, we developed a progressive, challenging, and inexpensive physical activity intervention to improve the fitness performance of our high school students. Our goal was to develop a physical activity program that would enhance physical fitness abilities and provide school-aged students with a meaningful learning experience that was consistent with their developmental needs. We called our program “Medicine Ball for All” simply because it used medicine balls and was purposefully designed to be appropriate for all school-aged children regardless of body size or fitness level.

We evaluated the effectiveness of our “Medicine Ball for All” program by randomly assigning high school physical education students into a medicine ball training group or a control group that participated in traditional physical education activities. After the 6-week training period, analysis of the data revealed that students who participated in the medicine ball training program made significantly greater gains in lower-back and hamstring flexibility, lower-body power, abdominal strength, upper-body strength, upper-body power, speed, and agility compared with the control group (9). Because these findings had important practical relevance for children and adolescents in all grades, our “Medicine Ball for All” program is now a part of



a district-wide physical education curriculum in kindergarten through 12th grade and is used by a growing number of teachers, coaches, and fitness professionals in after-school programs and youth sport training centers.

We “activate” our youth fitness classes and sports conditioning programs by incorporating medicine ball training into the first 10 to 15 minutes of nearly every workout. During this time, children perform a variety of medicine ball exercises that progress from simple to complex as their competence and confidence improve. Although a general warm-up of low intensity aerobic exercise and static stretching is a common practice before most recreational activities and sport competitions, long-held beliefs regarding the routine practice of preevent static stretching have recently been questioned (14). Dynamic warm-up protocols that require balance, coordination, power, and speed have been shown to enhance performance in children and adolescents, whereas preevent static stretching has been shown to reduce performance torque in youth (15).

Although there are literally thousands of exercises that can be performed with medicine balls, our “Medicine Ball for All” program follows a simple progression, so students experience small successes every class. The idea is for all participants to gain confidence in their abilities to be physically active while exercising with medicine balls. Instead of complex exercises in which most students will fail, we begin with relatively easy movements that most children can master with a few simple coaching cues. We generally begin with approximately 15 exercises during the first week and add a few exercises every other week as the class progresses. Over the course of the program, students may perform up to 40 different medicine ball exercises each class. Depending on individual needs, goals, and abilities, participants perform 1 to 3 sets of 7 to 10 repetitions of each exercise. From our experience, this repetition range allows participants to perform each repetition of an exercise at the correct movement speed without undue fatigue. In our medicine ball training programs, success is not measured simply by

Photo courtesy of Avery Faigenbaum, Ed.D., CSCS, FACSM.



assessing gains in muscular strength but rather by mastering tasks and moving forward in difficulty levels (Table 2).

We group our medicine ball exercises into the following seven categories: lower body (*e.g.*, single leg dip), upper body (*e.g.*, chest push), stability (*e.g.*, single leg reach), reaction (*e.g.*, wall ball chest press), core (*e.g.*, V-sit twist), specialty (*e.g.*, get up and catch), and flexibility (*e.g.*, straddle ball roll). Within each category, the exercises progress from the least challenging to the most challenging. Level 1 and level 2 exercises are the easiest to perform, whereas level 5 and level 6 exercises are the most complex and are specifically designed to elicit maximum muscle fiber recruitment while challenging cognitive abilities. For example, the “wall ball chest press” is a level 1 exercise that requires each child to stand approximately 8 ft from a wall and firmly toss a rubber medicine ball against the wall and catch it after one bounce. An example of a level 6 exercise is the “get up and catch” that requires participants to sit on the floor with a ball near their chest and then toss the ball upward and quickly stand up to catch the ball before it hits the ground. A more detailed description of our “Medicine Ball for All” program is available elsewhere (10).

## TABLE 2: General Medicine Ball Training Guidelines

- The exercise environment should be safe and free of hazards.
- Begin each class with dynamic warm-up activities.
- Start with one set of 7 to 10 repetitions with a lightweight ball (1 to 2 kg).
- Begin with simple exercises and gradually progress to more challenging exercises over time.
- Gradually increase the number of sets, exercises, and weight of the ball.
- Two to three nonconsecutive training sessions per week are recommended.
- Focus on developing proper exercise technique.
- Vary the training program to optimize adaptations and reduce boredom.

## SUMMARY

As parents, teachers, coaches, and fitness professionals, we all have the shared responsibility of encouraging children and teenagers to be physically active on most, if not all, days of the week. With this objective in mind, we must strive to provide boys and girls with enjoyable experiences that increase their confidence in their abilities to be physically active. Along with other types of physical activity, medicine ball training can be a safe, effective, and fun method of developing and enhancing health-related fitness, physical competence, and positive attitudes about physical activity in children and adolescents. Because medicine balls come in a variety of shapes and sizes, qualified

# Medicine Ball Training for Kids

fitness professionals can design medicine ball programs for youth with differing needs, goals, and abilities.

## References

1. Strong, W., R. Malina, C. Blimkie, et al. Evidence based physical activity for school-age youth. *Journal of Pediatrics* 146(6): 732–737, 2005.
2. American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 7th ed. Philadelphia: Lippincott Williams & Wilkins, 2006.
3. Faigenbaum, A. Resistance training for children and adolescents: are there health outcomes? *American Journal of Lifestyle Medicine* 1(3):190–200, 2007.
4. Faigenbaum, A., and W. Westcott. *Strength and Power for Young Athletes*. Champaign: Human Kinetics, 2000.
5. International Health, Racquet and Sportsclub Association. *2006 Profiles of Success*. Boston: International Health, Racquet and Sportsclub Association, 2006.
6. YMCA of the USA. YMCAs expand programs to respond to nation's growing health crisis. Available at [www.ymca.net](http://www.ymca.net). Accessed September 15, 2007.
7. National Association for Sport and Physical Education. *Moving into the Future: National Standards for Physical Education*. 2nd ed. Reston: National Association for Sport and Physical Education, 2004.
8. Faigenbaum, A., W. Kraemer, B. Cahill, et al. Youth resistance training: position statement paper and literature review. *Strength Conditioning* 18(6):62–75, 1996.
9. Faigenbaum, A., and P. Mediate. The effects of medicine ball training on physical fitness in high school physical education students. *The Physical Educator* 63(3):160–167, 2006.
10. Mediate, P., and A. Faigenbaum. *Medicine Ball for All Kids*. Monterey: Healthy Learning, 2007.
11. Malina, R. Weight training in youth-growth, maturation and safety: an evidence-based review. *Clinical Journal of Sports Medicine* 16(6):478–487, 2006.
12. Bailey, R., J. Olsen, S. Pepper, et al. The level and tempo of children's physical activities: an observational study. *Medicine & Science in Sports & Exercise*, 27(7):1033–1041, 1995.
13. Dishman, R., R. Motl, R. Saunders, et al. Enjoyment mediates effects of a school-based physical-activity intervention. *Medicine & Science in Sports & Exercise*, 37(3):478–487, 2005.
14. Thacker, S., J. Gilchrist, D. Stroup, et al. The impact of stretching

on sports injury risk: a systematic review of the literature. *Medicine & Science in Sports & Exercise*, 36:371–378, 2004.

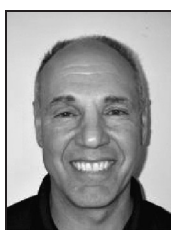
15. Faigenbaum, A., and J. McFarland. Guidelines for implementing a dynamic warm-up for physical education. *Journal of Physical Education Recreation and Dance* 78(3):25–28, 2007.

## CONDENSED VERSION AND BOTTOM LINE

Resistance training with medicine balls can be a safe, effective, and enjoyable experience for school-aged youth. With qualified supervision, age-specific instruction, and a stepwise progression, medicine ball training can offer observable health and fitness value to children and adolescents with differing needs, goals, and abilities. Along with other types of physical activity, the “Medicine Ball for All” program can be used to “activate” youth programs while providing an opportunity for all participants to gain confidence in their abilities and feel good about their successes.



*Avery Faigenbaum, Ed.D., CSCS, FACSM, is an associate professor in the Department of Health and Exercise Science at The College of New Jersey. As a leading researcher and practitioner, he has coauthored more than 100 scientific articles, 20 chapters, and 7 books on youth fitness and conditioning.*



*Patrick Mediate, Ed.M., CSCS, is a physical education teacher and track and field coach at Greenwich High School in Greenwich, CT. He is the founder of Physio-fit personal training and has developed creative conditioning programs for school-aged youth as well as college and professional athletes.*