



## ACSM Sports Medicine Basics

# PLYOMETRIC TRAINING FOR CHILDREN AND ADOLESCENTS



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Children and adolescents need to participate regularly in physical activities that enhance and maintain cardiovascular and musculoskeletal health. While boys and girls have traditionally been encouraged to participate in aerobic training and strength building activities, a growing number of children and adolescents are experiencing the benefits of plyometric training in schools, fitness centers and sports training programs. Plyometrics refer to exercises that link strength with speed of movement to produce power and were first known simply as “jump training.”

Current research has underscored the potential benefits of plyometric training for school-age youth. Previously thought of as a method of conditioning reserved for adult athletes, the American College of Sports Medicine (ACSM) contends that plyometric training can be a safe, effective and fun activity for children and adolescents provided that the program is properly designed, sensibly progressed and supervised by qualified professionals.

Plyometric training conditions the body through dynamic, resistance exercises. This type of training typically includes hops and jumps that exploit the muscles’ cycle of lengthening and shortening to increase muscle power. Plyometric exercises start with a rapid stretch of a muscle (eccentric phase) and are followed by a rapid shortening of the same

muscle (concentric phase). With plyometric training, the nervous system is conditioned to react more quickly to the stretch-shortening cycle. This type of training enhances a child’s ability to increase speed of movement and improve power production. Regular participation in a plyometric training program may also help to strengthen bone and facilitate weight control. Furthermore, well-rounded fitness programs that include plyometric training have been found to decrease the risk of sports-related injuries. This may be of particular benefit to young female athletes who are at increased risk for knee injuries as compared to young male athletes.

There are thousands of plyometric exercises, ranging from low intensity double leg hops to high intensity drills such as depth jumps. Although the latter is typically associated with plyometric training for the mature athlete, common games and activities such as hopscotch, jumping rope and jumping jacks can also be characterized as plyometrics because every time the feet make contact with the ground the quadriceps are subjected to the stretch-shortening cycle. In fact, plyometrics are a natural part of most movements, as evidenced by the jumping, hopping and skipping seen on any school playground. With qualified coaching and age-related instruction, plyometric training can be a safe, effective and fun method of conditioning for children and teenagers. However, there is the potential for injury to occur if the intensity and volume of

the training program exceeds the abilities of the participants.

Children and adolescents should develop an adequate baseline of strength before participating in a plyometric training program, or they should simply begin plyometric training with lower intensity drills and gradually progress to higher intensity drills over time. Although there is not one plyometric training program that is optimal for all youth, beginning with one to three sets of six to 10 repetitions on selected upper body (e.g., medicine ball chest pass) and lower body (e.g. double leg hop) exercises twice per week on nonconsecutive days seems reasonable. When youth are initially exposed to plyometric exercises, it may be beneficial to perform fewer repetitions and provide real-time feedback after each repetition to ensure the development of safe and correct movement patterns.

Unlike traditional strength training exercises, plyometric exercises are performed quickly and explosively. Plyometric exercises may be introduced into the dynamic warm-up period or incorporated into group game activities. Depending upon individual needs and goals, the plyometric training program can progress to include multiple jumps, single leg hops and throws using lightweight medicine balls. Modifying the program over time will help to maximize enjoyment, optimize gains and prevent overtraining.

Children and adolescents should be provided with specific information on proper exercise technique, rate of progression and safe training procedures (e.g., technique-based progression). Also, children and adolescents must wear supportive athletic footwear and plyometric exercises should be performed on surfaces with some resilience. Plyometrics are not intended to be a stand-alone exercise program and should be incorporated into a well-designed fitness program that also includes strength, aerobic, flexibility and agility training.

Plyometric training may not only make children and adolescents faster and more powerful; this type of training may offer observable health benefits by preparing youth for the demands of recreation and sport activities. The contention that plyometrics are inappropriate for boys and girls is not consistent with current research and the needs of children and teenagers. Plyometric training can be a safe, effective and fun method of conditioning for children and adolescents provided that age-related guidelines are followed, qualified instruction is available and individual concerns are addressed.

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Suggested Citation: Faigenbaum, A. and Chu, D. Plyometric Training for Children and Adolescents. Indianapolis, IN: American College of Sports Medicine; 2017.

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