



Conditioning Fundamentals

Plyometrics for Kids: Facts and Fallacies

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All children need to participate regularly in physical activities that enhance and maintain cardiovascular and musculoskeletal health. Traditionally, children have been encouraged to perform aerobic activities such as bicycling and strength building activities such as push-ups. More recently, the potential benefits of plyometric training for youth have received increased attention (2,3,4). Previously thought of as a method of conditioning reserved for adult athletes, a growing number of trainers, teachers, and youth coaches are now incorporating plyometric training into their physical education classes and sport conditioning workouts.

Plyometrics were first known simply as “jump training” and refer to a type of exercise that conditions the body through dynamic, resistance exercise (1). Plyometric training typically includes hops, jumps, and medicine ball exercises that exploit the muscles’ cycle of lengthening and shortening to increase muscle power. Plyometric exercises start with a rapid stretch of a muscle (called an eccentric muscle action) and are

followed by a rapid shortening of the same muscle (called a concentric muscle action). The rapid stretching and shortening of a muscle during a plyometric exercise is referred to as a stretch-shortening cycle. Even common playground activities such as jumping jacks and hop scotch can be considered plyometric because the quadriceps at the front of the thigh stretch eccentrically when the child lands and then they shorten concentrically when the child jumps. These exercises, although game-like in nature, actually condition the body to increase speed of movement and improve power production.

Childhood may actually be the ideal time to implement some type of plyometric training program because the neuromuscular system of children is somewhat ‘plastic’ and can therefore readily adapt to the training stress. Although adults can certainly benefit from plyometric training, the so-called ‘skill-hungry’ years for learning motor skills occur during childhood. As such, the nervous system of children is primed to learn motor skills that involve jumping, hopping, skipping, running, and throwing.

If this window of opportunity is missed, a child who does not participate in this type of activity may not be able to catch up later on in life. In the long run, this child will be at a distinct disadvantage when the time comes to participate in more advanced training programs later in life. Perhaps it is not surprisingly to note that the best athletes in the world learn how to perform complex skills during childhood and adolescence.

Myths That Won’t Quit

While clinical observations and research findings indicate that well-planned and well-implemented plyometric training programs can help youth develop movement competence (2,4), some observers still believe that plyometrics are inappropriate or even unsafe for children. Unfortunately, some have a very narrow view of plyometric training and only associate drop jumps from a 32 inch box as plyometric. While this high intensity drill may be appropriate for highly trained adult athletes, there are literally hundreds of other plyometrics exercises, including low intensity double leg hops and throws with lightweight (1 to 2 kg) medicine balls, which can be part of



Figure 1. Double Leg Cone Hop

a child's plyometric training program. Other common myths associated with youth plyometric training are discussed below:

Myth: Youth who have not reached puberty should not perform plyometrics.

Fact: Children can begin plyometric training when they have the emotional maturity to accept and follow directions. As a point of reference, many seven and eight year old boys and girls have participated in progressive plyometric training programs over the years.

Myth: Children will experience bone growth plate damage as a result of plyometric training.

Fact: A growth plate fracture has not been reported in any prospective youth resistance training research study which was competently supervised and appropriately designed. Interestingly, some clinicians believe that the risk of a growth plate fracture in a prepubescent child is actually less than in an older child because the growth plates of younger children may be stronger and more resistant to shearing-type forces (5).

Myth: Plyometric training is unsafe for children.

Fact: With appropriate supervision and a sensible progression of training intensity and volume, the risks associated with plyometric training are not greater than other activities in which children regularly participate. The key is to start with a few simple exercises, provide qualified supervision, perform these drills twice per week on nonconsecutive days, and gradually progressive as confidence and ability improve. This is especially important for sedentary children who typically have suboptimal levels of strength and power.

Myth: Plyometric training is only for young athletes.

Fact: Children of all abilities can benefit from plyometric training. While plyometric exercises can be used to enhance athletic performance and reduce the risk of sports-related injuries, regular participation in a plyometric program can enhance the fitness abilities of sedentary boys and girls too. At a time when a growing number of children spend more time in front of the television than at the playground, participation in a progressive plyometric training program can

offer observable health and fitness value to most participants.

Program Design Considerations

Plyometric training is a specialized method of conditioning that requires appropriate overload, gradual progression, and adequate recovery between exercise sessions. Moreover, plyometric programs should include proper coaching, a safe training environment, and a slow but steady advancement from education to progression to function. Since the performance of a plyometric exercise is a learned skill, proper instruction is needed to ensure continuation of correct exercise technique. Instructors should be careful to match the plyometric training program to the needs, interests, and abilities of each child. An advanced plyometric training program for a young athlete would be inappropriate for an inactive child who should be given an opportunity to experience the mere enjoyment of different types of hopping, jumping, and throwing exercises. One of the most serious mistakes in designing a youth plyometric training program is to prescribe a training intensity that exceeds a child's capacity. In short, it is always better to underestimate the physical abilities of a child rather than overestimate them and risk negative consequences (e.g., dropout or injury).

There are literally hundreds of plyometric exercises that children can perform depending on training experience and ability. Children should begin with low intensity drills (e.g., double leg jump or medicine ball chest pass) and gradually progress to higher intensity drills (e.g., lateral cone hop or single leg hop) over

time. In addition to body weight movements, exercises using medicine balls can also be effective. In terms of sets and repetitions, beginning with one to two sets of six to 10 repetitions on a variety of upper and lower body exercises twice per week on non-consecutive days seems reasonable. If multiple sets are performed, children should be allowed to recover between sets in order to replenish the energy necessary to perform the next series of repetitions at the same intensity. Unlike traditional strength exercises, plyometric exercises need to be performed quickly and explosively. The table highlights general youth plyometric training guidelines.

Since plyometrics are not designed to be a stand-alone program, youth conditioning programs should include a variety of skills and drills that are specifically designed to enhance different fitness components. In fact, plyometrics actually work best when integrated into a multi-faceted program that includes other types of training (2). Furthermore, it is important for children to be exposed to different types of conditioning and actually understand the concept of a fitness workout. Combining fitness components is not only more effective and time efficient, but this type of training is more fun for young participants who tend to dislike prolonged periods of monotonous training. While there are no short cuts or gimmicks to enhancing strength, speed, and power, with guidance and encouragement children will gain confidence in their abilities to perform relatively easy drills and therefore they will be more willing and able to perform at a higher level.

Summary

A growing number of children are now experiencing the benefits of plyometric training. In addition to enhancing fundamental fitness abilities and improving sports performance, regular participation in a well-designed plyometric training program may also reduce the risk of injury in youth sports (2,4). What's more, plyometric training during childhood may build the foundation for dramatic gains in muscular strength and power during adulthood. With appropriate guidance and progression, plyometrics can be a worthwhile addition to a well-rounded youth fitness programs that also includes aerobic, strength, and flexibility training.

References

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4. Hewett T, Myer G, Ford K. (2005). Reducing knee and anterior cruciate ligament injuries among female athletes. *Journal of Knee Surgery*, 18(1): 82 – 88.

Figure 2. Medicine Ball Chest Press



Youth Plyometric Training Guidelines

- Provide qualified instruction and supervision
- Wear sneakers with tied laces and train on a nonskid surface
- Begin each session with a dynamic warm-up
- Start with one set of 6 to 10 repetitions on low intensity exercises
- Develop proper technique on each exercise before progressing to more advanced drills
- Include exercises for the upper and lower body
- Progress to 2 or 3 sets of 6 to 10 repetitions depending on needs, goals, and abilities
- Allow for adequate recovery between sets and exercises
- Perform plyometric exercises twice per week on nonconsecutive days
- Keep the program fresh and challenging by systematically varying the training program.

5. Micheli L. (1988). Strength training in the young athlete. In E. Brown & C. Branta (Eds.), *Competitive Sports for Children and Youth* (pp. 99 – 105). Champaign, IL: Human Kinetics.

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