

Plyometric Training - Part I

What It Is and What It's Not.

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As a performance enhancement consultant, it has been my experience that “plyometric” training is one of the most requested forms of training by athletes. All have heard the stories of great power development accredited to this method of training. To add to the mystery, plyometrics originated as a training method in the secretive eastern block countries where it was referred to as “jump training”. As the eastern block countries rose to become powerhouses in sports, plyometric training was credited for much of their success. In the 1920s, the sport of track and field was the first to employ a systematic method of using plyometric-training methods. By the 1970s this methods of power development was being used by other sports that required explosive power for successful competition. This article is the first of a three part series. It answers some basic questions about plyometrics and its efficacy in enhancing human performance. The second part of this series deals with lower body plyometric programming. The third and last part of this series discusses upper body plyometric training. Plyometrics comes from the Greek word “pleythein” (i.e. to augment or increase). However, the actual word plyometrics was first coined in 1975 by American track coach, Fred Wilt. Based from the Latin root words “plio” (i.e. more) and “metric” (i.e. to measure). Plyometrics can best be described as “explosive-reactive” power training. This type of training involves powerful muscular contractions in response to a rapid stretching of the involved musculature. These powerful contractions are not a pure muscular event; they have an extremely high degree of central nervous system involvement. The event is a neuromuscular event! It is a combination of an involuntary reflex (i.e. a neural event), which is then followed by a fast muscular contraction (i.e. voluntary muscular event). Sound complicated? Well, it's really not. We all have seen it, experienced it and continue to use this type of “reactive” movement pattern to develop power. We all do it everyday. For example, every person that has been to a physician has experienced a plyometric event. When the doctor tapped under your kneecap, causing your leg to jerk, what do you think he/she was checking? The tapped caused a sudden stretch of the tendon that connects to all of the quadriceps (i.e. the muscle involved in extending the knee). Small receptors within the quadriceps create a stretch reflex, which makes the quadriceps responded by contracting explosively. The stretch reflex that caused the leg to extend is called the “myotatic reflex” and is the basis of plyometric physiology. The most common human movement, running, is completely a plyometric event. Other common plyometric events include throwing, swinging a golf club/bat, jumping and skipping! This stretching of the muscles, prior to the explosive contraction that follows, is often called “loading”. The faster and greater the load, the more powerful the reflex and subsequent contraction. A good example of this is watching any basketball player jump. They jump higher when they can take a few steps before the jump. The reason for this is that the few steps create momentum. This momentum is used to create a bigger and faster “load” on the leg plant prior to jumping. The response to this greater load is a greater contraction by the legs and a higher jump height. The same phenomenon exists with all explosive actions. Many times people confuse some forms of power training for plyometrics. Plyometric training is only one form of power training. A true plyometric exercise must contain a very fast loading phase. That is, for the stretch reflex (i.e. myotatic reflex) to invoke a powerful contraction, it must occur extremely fast. If the doctor pushed on the tendon below the kneecap, instead of quickly tapping it, would the knee involuntarily jerk up? Of course not, no matter how fast the doctor pushed on that tendon. Therefore, a jump (i.e. from an athletic position) onto a 24-inch box is a power exercise, but not a plyometric exercise. To make it a plyometric exercise one can jump off a 6-12-inch box, hit the ground and immediately jump onto the 24-inch box. The landing from smaller box loads the legs quick enough to create the stretch reflex needed in plyometric training. This is very demanding – don't try it without consulting a professional! By now you should have a better understanding of what constitutes a plyometric exercise. Hopefully, they are not as mysterious as you once thought they were. You should realize that everything we do fast has some plyometric component in it. That's how come we can do it fast! So, who can participate in plyometric training? The answer is everyone! With proper supervision and progression, everyone can partake in plyometric training, from children to the senior population. If you want to see the real kings of plyometric training, go to any playground and watch children play. Some of the athletes I train have performed many exercise “stolen” from six-year olds. As for my senior clients, many participate in watered

down versions of hopscotch and skipping games. Seniors not only get great strength, power and balance benefits from plyometric activities, they relive great times – they love it! The only problem is getting them to stop laughing. Athletes obviously stand to gain significant power development from the prudent use of plyometrics. As with the non-athletic population, proper progression is again a key concern. Since I've harped on proper progression, let's define it as it pertains to plyometrics. First and most important, the proper strength base must be developed to support the increased force production that results from the stretch reflex. Remember that the reflex involved in plyometric training allows you to contract your muscles with greater force than you could through a voluntary contraction. Therefore, we must make sure that the musculature can support this increased force production. Secondly, a higher degree of balance and stability are also needed for the quick loading phase. Although a specific body part may seem exclusively involved, the percussive shocks that bring about the myotatic reflex are felt throughout the entire body – all structures must have good integrity to support this training. Third and last, simpler skills must be mastered before progressing to more difficult exercises. Plyometric training has received some bad press. Inappropriate use of plyometric training has been associated with various forms of "over-use" injuries, especially in the lower extremities (e.g. patellar and Achilles tendonitis and plantar faciitis). This type of training, especially when done at a very high intensity, is a high-risk endeavor (i.e. high returns but at high risk). Like any other high-risk maneuver, high intensity plyometrics should not be designed or performed without the supervision of a professional overseeing the training, and response, to the exercise protocol. In closing, everyone should understand that like any other type of training, plyometric training is a continuum. We are all involved in plyometric events everyday. Some of us are exposed to very low levels, while others participate in higher intensities. Regardless of the level of participation, the key to safe participation in plyometrics is proper progression. I can't emphasize this enough! Part II of this series deals with the basic categories of lower body plyometric exercises and some general recommendations to safe programming and participation.