It may sound like the latest action film, but controlled impact and maximum power are the aims of training technique called plyometrics.

Also known as jump training, plyometrics involves stretching the muscles prior to contracting them. This type of training, when used safely and effectively, strengthens muscles, increases vertical jump and decreases impact forces on the joints.

Plyometrics mimics the motions we use in sports such as skiing, tennis, and basketball. If you enjoy dodging moguls, chasing down ground strokes or charging the net, plyometrics might be an appropriate training option, as these exercises are designed to increase muscular power and explosiveness. Plyometrics is not, however, for those who are in poor condition or have orthopedic limitations.

Olympic Secrets

The Eastern Europeans first used plyometrics in the 1970s to develop greater strength and power in their Olympic athletes. They based their programs on scientific evidence that stretching muscles prior to contracting them elicits the "myotactic" reflex, or stretch reflex, of muscle to enhance the power of contraction.

This pre-stretching of muscles occurs when you perform jumps one after the other. For example, when you land from a jump, the quadriceps muscles at the front of your thighs stretch as your knees bend, and then quickly contract with the next leap. This pre-stretch enhances the power of the second jump.

Proceed With Caution

Plyometric training has received its share of criticism due to reported cases of injury following "plyometric" programs of depth jumping and drop jumping, which involve jumping up to, and down from, boxes or benches that are as high as 42 inches.

The forces sustained from these types of jumps onto hard surfaces can be as much as seven times one's own body weight. However, carefully considering the type of jumps selected for the program, enlisting a coach or trainer for supervision and gradually progressing to more difficult exercises can make a plyometric program both safe and effective.

Jumps should always begin from ground level, off of and onto padded surfaces such as grass or a gym mat over a wood gym floor. These types of jumps are both safe and easy to perform. Other training techniques include jumping over cones or foam barriers, and traveling bounding.

Research has consistently shown that plyometric training can help lead to improvements in vertical jump performance, leg strength, muscle power, acceleration, balance and overall agility.

These factors contribute to reducing an individual's potential risk of injury. In addition, some studies have shown plyometrics to have a positive effect on bone density, especially in younger participants.

Quality, not Quantity

A safe and effective plyometric program stresses the quality, not quantity, of jumps. Safe landing techniques, such as landing from toe to heel from a vertical jump, and using the entire foot as a rocker to dissipate landing forces over a greater surface area, also are important to reduce impact forces.

In addition, visualization cues, such as picturing yourself landing "light as a feather" and "recoiling like a spring" after impact, promote low-impact landings.

When landing, avoid excessive side-to-side motion at the knee. Landing forces can be absorbed through the muscles that help support and protect the knee joint (quadriceps, hamstrings and gastrocnemius) more effectively when the knee is bending primarily in only one plane of motion.

Additional Resources

American College of Sports Medicine Current Comment—Plyometric Training for Children and Adolescents: [www.acsm.org/AM/Template.cfm?Section=CurrentComments1&Template=CMContentDisplay.cfm&ContentID=8649]

American College of Sports Medicine Current Comment—Explosive Exercise: [www.acsm.org/AM/Template.cfm?Section=CurrentComments1&Template=CMContentDisplay.cfm&ContentID=8644]

If you are interested in information on other health and fitness topics, contact: American Council on Exercise, 4881 Paramount Drive, San Diego, CA 92123, 800-825-3636 or, go online at www.acefitness.org and access the complete list of ACE Fit Facts.

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