

# Introduction to Plyometrics

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**F**or the healthy athlete, the benefits of a plyometric program have been proven in the scientific literature and anecdotally. Plyometric exercise is one of the most time-efficient training methods available, and has arguably the greatest transfer to sport application. Plyometric techniques can be executed for the entire body and also simulate specific movements observed in competition. They can be done with little to no equipment and the surface of choice is often a level grass field. Plyometrics are often performed in various planes of movement (up/down, left/right, and forward/backward).



There are several considerations that should be observed prior to implementing a plyometric program. Some of those considerations are:

- Age
- Body Weight
- Strength Prerequisite
- Sport Requirements
- Experience
- Previous Injury
- Jumping Surface
- Warm-up
- Progressions
- Recovery
- Frequency

One key aspect of plyometric exercise selection is to use a progression of movements before attempting more complex movements. Generally, try movements with both feet before one. Use a single repetition before moving to multiple repetitions. Emphasis should be placed on quality of movement at all times. There should be complete recovery between sets and exercises before proceeding with the workout. It is advisable to start with only one or two exercises in a training session and then add more to the routine as needed.

The remainder of this article will focus on some basic plyometric movements. These movements should only be implemented with experienced instruction in plyometric training.

## Standing Jump Over Cone

The standing jump over a cone is used to progress to multiple jumps over cones. The athlete begins the movement behind the cone (see Figure 1) and makes a single jump (see Figure 2) over the cone and a controlled landing (see Figure 3). There is a combination of vertical and horizontal components that should be emphasized for the drill. In addition to visual observation, good body control can be determined if the athlete does not make any additional steps after the landing to regain balance.

## Front Cone Hops

Front cone hops progress from the standing jump over cones. These multiple front cone hops are an excellent double leg plyometric drill for a variety of skill and sized athletes. A series of cones or barriers are placed in a line in front of the athlete. With double arm action the athlete simply hops over the barriers. Contact time on the ground should be as brief as possible, with the athlete maintaining a neutral spine position.



Figure 1 (far left): Standing jump over cone—preload

Figure 2 (left): Standing jump over cone—apex

Figure 3 (below): Standing jump over cone—landing

## Lateral Jump Over Cone

A single lateral jump over a cone is used to progress to multiple lateral jumps over a cone. The athlete begins the movement on one side of the cone (see Figure 4) and makes a single jump (see Figure 5) over the cone and a controlled landing (see Figure 6). In addition to visual observation, good body control can be determined if the athlete does not make any additional steps after the landing to regain balance.



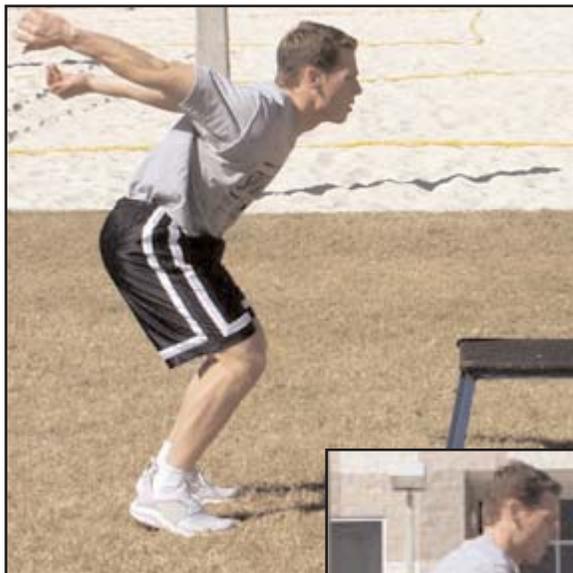
Figure 4 (left): Lateral jump over cone—preload

Figure 5 (center): Lateral jump over cone—apex

Figure 6 (right): Lateral jump over cone—landing

## Box Jumps

The athlete is about an arms length away from a box that is of suitable height. The box height should allow the athlete to land with their knee bent to approximately 120 degrees. The athlete takes a forceful countermovement (see Figure 7) with a double arm swing flexing at the knees and hips. The torso is flat with the chest up. The athlete fully extends at the hips and knees, creating maximal force. While preparing for landing the hips and knees flex, the toes are up (see Figure 8). The athlete lands softly on top of the box to complete a single response (see Figures 9 and 10).



(From left to right)

Figure 7: Box jump—preload

Figure 8: Box jump—apex

Figure 9: Box jump—landing (side view)

Figure 10: Box jump—landing (front view)

## Double Leg Hops

Double leg hops should emphasize height and distance. Use both arms to help generate power. The athlete takes a quick counter-movement (see Figure 11) and explodes with maximum effort, fully extending the body (see Figure 12). The athlete lands softly with bend knees and hips (see Figure 13). No additional steps are taken which depicts good body control. Keep the amortization phase, or foot contact time to a minimum and keep the head up when using multiple repetitions.



Figure 11 (upper left): Double leg hop—preload

Figure 12 (center): Double leg hop—fully extended

Figure 13 (bottom right): Double leg hop—landing

## Two Hand Chest Pass

For the two hand chest pass use a medicine or plyometric ball. The athlete stands with feet shoulder width apart (see Figure 14). While taking a step forward they bend and extend their elbows (see Figure 15). When the front foot lands they release the ball from their hands (see Figure 16). Alternate which foot steps forward for the drill. Multiple repetitions can be implemented between two athletes when appropriate.



Figure 14 (top left):  
Two hand chest pass—start

Figure 15 (center):  
Two hand chest pass—extension

Figure 16 (bottom right):  
Two hand chest pass—release

## Plyometric Push Up

The plyometric push up from the ground is performed in a prone position. For the single response, position the hands wider than shoulder width and place the feet together with the toes on the ground. Maintain a rigid position, with the head, torso, trunk and legs in line. Perform a countermovement by lowering the body (see Figure 17), then exploding back up. Enough force should be generated so that the hands can leave the ground (see Figure 18) and perform a clap. Place the hands back out in front to catch the body, returning to the starting position (see Figure 19). Use a single response before progressing to multiple responses.

For multiple responses the athlete sets up the same way. Perform the counter movement and explode upward, trying to clap the hands. While the upper body is still in the air, return the hands to a position in front of the body. As the hands come in contact with the ground, reverse the motion and repeat the exercise with no rest. Keep the contact time, or amortization phase, as short as possible.



Figure 17 (top): Plyometric push up—start



Figure 18 (right): Plyometric push up—airborne

Figure 19 (bottom right): Plyometric push up—landing



## Conclusion

The exercises listed in this article are intended to be a menu from which exercises are selected for a program. These movements should not be used as a plyometric program by itself. For more information on plyometrics, including progression, physiology, and implementing into a periodized program, consult the NSCA's *Essentials of Strength and Conditioning*, *Journal of Strength and Conditioning*, and *Journal of Strength and Conditioning Research*.

### About the Author

*Michael Barnes, MEd, CSCS,\*D, NSCA-CPT earned his Masters degree in Human Performance from Auburn University. Mike is presently the Education Director for the National Strength and Conditioning Association and is a Certified Strength and Conditioning Specialist and a National Strength and Conditioning Association Certified Personal Trainer. Previous work experience includes, a Division I Strength and Conditioning Coach, Strength and Conditioning Coach for USA Rugby and seven years as the Strength Development Coordinator for the San Francisco Forty-Niners.*

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