

# Plyometric Training

Athletes from a wide range of sports use plyometric training to help them reach peak physical condition. Used correctly, it can be a highly effective form of [power training](#), especially when combined with a suitable [strength training program](#).

A wide variety of training studies shows that plyometrics can improve performance in vertical jumping, long jumping, sprinting and sprint cycling. It appears also that a relatively small amount of plyometric training is required to improve performance in these tasks. Just one or two types of plyometric exercise completed 1-3 times a week for 6-12 weeks can significantly improve motor performance. Additionally, only a small amount of volume is required to bring about these positive changes i.e. 2-4 sets of 10 repetitions per session or 4 sets of 8 repetitions.

## Exercise Intensity

The intensity of plyometric exercises varies greatly. Skipping exercises are classed as low intensity, while reactive drop jumps from 32in (80cm) and above are the highest intensity of the plyometric exercises. See the table below for further intensity classifications:

Intensity of Various Plyometric Exercises	
Exercise Type	Intensity
Depth jumps 32-48in (80-120cm)	High
Bounding Exercises	Submaximum
Depth jumps 8-20in (20-50cm)	Moderate
Low impact jumps/throws	Low

## Volume

Plyometric volume relates to the number of repetitions per session. For lower body exercises a repetition is a ground contact. See the table below for the number of repetitions recommended for a plyometric training session:

Plyometric Volume Per Session	
Experience	Ground Contacts
Beginner	80 - 100
Intermediate	100 - 120
Advanced	120 - 140

## Frequency

Typically, 2-3 sessions of plyometrics can be completed in a week. Alternatively, recovery time between sessions can be used to prescribe frequency and is recommended at 48-72 hours.

It is not recommended that plyometric training be scheduled for the day after a heavy weight training session when muscles may still be sore. This poses a planning problem for athletes that may need to strength train 3-4 times per week. The table below offers a solution to this problem by alternating upper and lower body strength training with upper and lower body plyometrics:

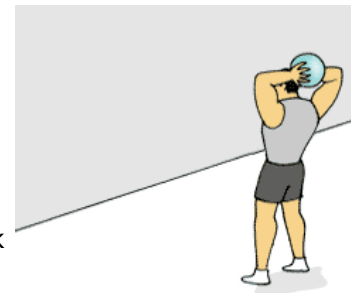
Intergrating Plyometrics with Concurrent Strength Training		
Day	Strength Session	Plyometric Session
Mon	Upper body (high intensity)	Lower body (low intensity)
Tue	Lower body (low intensity)	Upper body (high intensity)
Wed	Rest	Rest
Thu	Upper body (low intensity)	Lower body (high intensity)
Fri	Lower body (high intensity)	Upper body (low intensity)

There are many plyometric exercises for both the upper and lower body. As with other forms of sports training, exercise selection should mimic the movement patterns of the sport as closely as possible.

## Upper Body Plyometric Exercises

### Overhead Throws

1. Stand with one foot in front (staggered stance) with knees slightly bent.
2. Pull medicine ball back behind head and forcefully throw ball forward as far as possible into the wall.
3. Catch ball on the bounce from the wall and repeat according to prescribed repetitions. Keep the time between pulling the ball back and starting the throw (transition phase) to a minimum. Can also be completed with a partner instead of a wall.



### Plyometric Push-Ups

1. Start by getting into a push-up position.
2. Lower yourself to the ground and then explosively push up so that your hands leave the ground.
3. Catch your fall with your hands and immediately lower yourself into a push-up again and repeat.



### Squat Throws

1. Stand with feet slightly wider than hip-width apart. Knees should be slightly bent.
2. Hold medicine ball at chest level and squat down to a parallel position.
3. Quickly explode up and jump as high as you can. As you start your jump you should start to shoulder press the ball up and reach full extensions with the arms when you are at the peak of your jump. Push ball as high as possible into the air. Try to minimize the time spent in the squatted position. It should be a quick squat and jump.
4. Catch ball on the bounce and repeat according to prescribed repetitions.



## Lower Body Plyometric Exercises

### Squat Jumps (Low Intensity)

1. Stand with feet shoulder-width apart, trunk flexed forward slightly with back straight in a neutral position.
2. Arms should be in the "ready" position with elbows flexed at approximately 90°.
3. Lower body where thighs are parallel to ground and immediately explode upwards vertically and drive arms up. Do not hold a squat position before jumping up keep the time between dipping down and jumping up to a minimum.
4. Land on both feet. Rest for 1-2 seconds and repeat. Prior to takeoff extend the ankles to their maximum range (full plantar flexion) to ensure proper mechanics.



### Split Squat Jumps (Moderate Intensity)

1. Stand with feet hip width apart. Take left leg and step back approximately 2 feet standing on the ball of back foot.
2. Feet should be positioned at a staggered stance with head and back erect and straight in a neutral position.
3. Lower body by bending at right hip and knee until thigh is parallel to floor then immediately explode vertically.
4. Switch feet in the air so that the back foot lands forward and vice versa. Prior to takeoff extend the ankles to their maximum range (full plantar flexion) ensure proper mechanics.



### Depth Jumps (High Intensity)

1. Stand on box with toes close to edge, feet shoulder width apart.
2. Step off (do not jump off) box and land on both feet. Immediately jump up as high as possible and reach up with both hands towards. The jump should be vertical with no horizontal movement.
4. Ground contact time should be short unlike in the diagram. Landing should be soft. **Note:** Start with a box height of 30cm (12in). Intensity can be increased by gradually increasing the box height to a maximum of 107cm (42in) but this is only for experienced athletes with a substantial strength training background.



## Rest Intervals

The effectiveness of a plyometric training session depends on maximal effort and a high speed of movement for each repetition. Rest intervals between repetitions and sets should be long enough to allow almost complete recovery (4). As much as 5-10 seconds may be required between depth jumps and a work to rest ratio of 1:10 is recommended. For example, if a set of bounds takes 30 seconds to complete, the rest interval between sets would be 300 seconds or 5 minutes.