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# power training for endurance athletes

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**P**ower is the ultimate combination of the two most fundamental human factors if survival: speed and strength. From the true warrior to the finest athlete to young children, power is quintessential to success. Power by its very definition suggests you cannot go without, yet it deceives many and is generally considered necessary for contact sport or weightlifting athletes. However, many forget about the positive impact that power has on endurance performance.

## Power Defined

Physics defines power as the rate at which work is performed. Human physiology defines power as the ability to generate enough energy to accomplish a specific feat or task in the least amount of time possible. Simply put, if you want to perform better in a specific sport or in daily activities, you should incorporate some form of power training into your workouts. For the endurance athlete this is no exception. In fact, power training may considerably improve running times by enhancing both physiological and mental functions.

The very nature of the work endurance suggests that power is not a significant part of the equation. For power to truly exist, the duration of the of an activity must be quick in nature, but with endurance, the opposite is true. Since the endurance athlete focuses on many aspects of improving metabolic efficiency, the idea of being explosive eludes many of these athletes. Being more explosive gives the endurance athlete another tool they can utilize during training and competition, such as speed to burst at the end of a race, power to climb a hill and confidence knowing that you have more in “the tank” if needed.

## Why Power Training?

The obvious connection of explosive training to power sports makes it training for endurance sports seem counter intuitive. The endurance athlete typically spends time doing Long Slow Duration (LSD) training mixed with interval training. Why do intervals? By comparison, it is relatively new to training since people have been running distances for centuries. They are performed in order to improve anaerobic threshold parameters as well as maximal aerobic power. Power training is also beneficial to the endurance athlete for the same reason but for a different application. Power training can improve an endurance athlete's submaximal strength as well as maximal power. This translates to an easier time running hills, applying quick bursts or improving maximal speed.

## When do we add Power?

Since intervals have become commonplace in the endurance athletes training program, it may seem wise to add explosive exercises to your daily routine as well. However, power training comes at a cost. High intensity exercise places greater stress on the soft tissue network (such as muscles, tendons, and liga-

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Pronunciation: \ `pau(-ə)r\

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## Table One

The following set of workouts are for combining your power and strength exercises into one workout. Each day could be done once or twice per week. If you are looking for a 3 day program, use the workout below, then the following two tables.

## Upper Body Day

Exercise	Sets	Reps	Rest
<b>Speed/Power/ Plyometrics</b>			
Medicine Ball Chest Pass	4	6	1 min
Medicine Ball Power Drop	4	6	1 min
Plyo Push Up	2	6	1 min
<b>Basic Strength/Hypertrophy</b>			
Flat Bench Press	3	12	90 sec
Incline Dumbbell Press	2	10	90 sec
Seated Row	3	12	90 sec
Lat Pulldown	2	10	90 sec
Overhead Press	3	10	90 sec

## Lower Body Day

Exercise	Sets	Reps	Rest
<b>Speed/Power/Plyometrics</b>			
Box Jump	4	6	1 min
Split Jump	4	6	1 min
Lateral Hurdle Hops	3*	6	1 min
Leg Press (timed for speed)	3	10	90 sec
Leg Extension (timed for speed)	3	12	90 sec
<b>Basic Strength/Hypertrophy</b>			
Leg Curl	3	12	
Romanian Deadlift	4	8	
Standing Calf Raise	3	15	

\*performed to each side

ments) as well as a significantly higher neurological demand on the central nervous system (1). To combat these stresses, power training should be done in cycles, allowing the athlete plenty of recovery time to focus on other aspects of endurance sports. When adding explosive exercises to your program, they should be done first after a good warm-up, last no more than twice per week, and cycled off after 3-4 weeks of training. More importantly, explosive exercises should not be done right before a big event, rather, your power training should end 2 weeks before your major competition. For those who compete year round, power exercises should be included in the training program when training for less important events.

### What type of explosive exercises should I do?

If you have rarely lifted weights in the past, you should stick to the basics, but for those who are more experienced with weight training, power cleans, and snatches provided form is correct, are safe and effective. In general though, you do not want to lose focus of your ultimate goal, which is moving your body on the field or the course, so this author's recommendation is to focus on bodyweight plyometric applications, lighter medicine ball exercises, and faster pace rep schemes for your general exercises.

### What are plyometrics and do I need them?

Plyometrics, often called "plyos", are a method of training which enhances muscle's natural ability to

contract more forcefully and rapidly. By decreasing the time and increasing the magnitude of the eccentric to concentric action of the muscle (known as the Stretch Shortening Cycle), the athlete improves his or her ability to produce greater force more rapidly, thus improving the overall power of the movement. Plyometric activity utilizes muscle's inherent stretch-contraction mechanism and over time, improves the rate at which force is developed. So yes, even an endurance athlete should perform plyometrics.

### Power training and workout pace

First and foremost, before you begin to train power you should make sure you have developed an adequate amount of strength to perform this type of training. While certain strength measures are not feasible, you should be able to perform deep barbell squats, bench presses, and basic pulling exercises. If you have never done these exercises before, power training is not recommended until after at least 8-12 weeks of solid strength training. For those who have established a base level of strength, workout pace will be a key. Although the idea of shorter rest, fast pace workouts are opposite to power training recommendations, for the endurance athlete, ultimate 1 time power is not requested. Power training for the endurance athlete should emphasize more Power-Endurance, rather than maxing power. Endurance athletes will still perform short rep sets of no more than 8 reps, however, rest time should be 60 seconds to no more than 90 seconds between sets (as opposed to the recommendation of 3-5 minutes for power athletes.)

Table two  
Training Circuit

Exercise for Beginner	Time/Reps	Rest	Modified Exercise for Moderate to Advanced
Seated Row	15s/8	10s	Bench Pull
Leg Press	15s/6	30s	Speed Squats w/ Bar
Bench Press	15s/6	15s	Bench Press
Leg Curl	15s/6	10s	Glute Ham Raise or RDL
Arm Curl	15s/10	10s	Arm Curl
Calf Raise	15s/15	10s	Calf Jumps for Speed
Overhead Press	15s/6	15s	Push Press or Push Jerk
Back Extension	15s/6	15s	Straight Leg Deadlift
Triceps Press	15s/10	10s	Dips or Triceps Press

Rest for 2 minutes then perform the above workout for 2 more circuits.

The above resistance workout should be performed twice per week for 3-4 weeks provided that a good strength base already exists. To keep time in the gym to a minimum, alternate exercises between upper and lower body after plyometrics. Resistance sets are times so that all lifts become “explosive” in nature. Rather than using a controlled slow rep speed, you should look to complete your reps in the time allotted.

Plyometrics and power training in general is beneficial to everyone, not just power athletes. Improving strength and speed, while maybe less important for the endurance athlete focusing on cardiovascular fitness, will improve overall performance. More importantly, the athlete will feel stronger and be more secure in his or her pacing knowing that they have the burst of speed and strength when needed. Be careful not to over-do-it, but also make sure to push yourself hard for more profound results.

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1. Fleck, SJ and WJ Kramer. *Designing Resistance Programs, 2nd Edition. Champaign, IL: Human Kinetics, 1997. 135-142. 1997.*

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