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The Importance of Power, and the Irrelevance of Measuring Power

Calculating the power output of a workout in foot-pounds per minute can be interesting, but does it really tell us anything about improving fitness?

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Susannah Dy/CrossFit Journal

Power is intensity, and intensity brings results.

In CrossFit, we maximize intensity by using a stopwatch. We apply this stopwatch to a wide variety of functional movements performed with full range of motion. More than any other single factor, this practice is responsible for the unprecedented results of our athletes. Therefore, many believe it logically follows that measuring power will allow us to maximize intensity, and thus results.

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Unfortunately, this simply isn't true because life demands the completion of tasks, not the maximization of power. There is an irony here. Measuring the physical power output of our workouts in terms of foot-pounds per minute is mostly irrelevant to the success of our efforts even though maximizing power output is vital. This distinction may appear contradictory at first but is nonetheless tremendously important.

Why Power Matters

In countless gyms, garages and hotel rooms across the world, diligent CrossFitters race against the clock every day to shave a few extra seconds from their workout times. They do this as a competition, with themselves, their friends or other CrossFitters posting results to CrossFit.com or an affiliate's site. They are also doing it because CrossFit tells them faster times mean they are fitter.

Why go faster? Because going faster both requires and produces higher levels of fitness. It's also true that you are producing more power in the process. Power is calculated as force multiplied by distance and divided by time. It's simple: maximize your load and the distance you move that load while minimizing the time it takes you to do so. Power and fitness are intimately linked.

If you doubt this, try a simple experiment. Do 20 air squats in a minute (at a pace of one every three seconds) and notice the effect this has on your muscles and respiratory rate. Recover fully, then do 20 air squats in 20 seconds (one every second). Notice the effect again. The same work performed in a third of the time is dramatically more potent.

This is generally true: increasing the average power of any workout makes it both harder and more effective. In fact, intensity (power) is the independent variable most strongly correlated with optimizing the results of a workout, taking precedence over volume, duration, target heart rate, etc. CrossFit's success is largely due to our maximization of intensity and power. We do this by using combinations of functional movements in relatively short workouts. (For a thorough definition of functional movements, see the *CrossFit Journal* article [Foundations](#) by Greg Glassman, April 1, 2002.)

The main downside to increased power and intensity is discomfort. The greater the intensity, the greater the discomfort. CrossFit can virtually guarantee you'll get fitter than you've ever been, but you'll work harder and have to manage the pain of intensity. Indeed, much of fitness is nothing other than the tolerance of discomfort.



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The snatch is a high-power movement, but only performing the snatch won't result in an elite level of fitness. Many low-power movements are just as important to health and fitness.

Training and Fitness

While it's true that maximizing power (intensity) is the key to fitness, it is not the only factor, and it must be applied in context. The CrossFit Games aside, the goal of CrossFit is not really to excel at CrossFit, but to improve real-world fitness. Performing constantly varied functional movements at (relatively) high intensity is CrossFit's prescription for optimizing fitness.

Over the years, a core stable of exercises has emerged and provides the primary components of CrossFit workouts. These are all functional movements, but not all functional movements are as effective as others. You see the best movements coming up most frequently in the main-site workouts:

Gymnastics: Pull-up, push-up, sit-up, squat, burpee, handstand push-up, rope climb, ring dip, muscle-up, box jump, back extension.

Weightlifting: Thruster, clean, jerk, snatch, deadlift, barbell squats (overhead, front, back), press, kettlebell swing, wall-ball.

Metabolic Monostructural: Run, row, jump rope.

A large number of secondary exercises can and should be incorporated, but experience shows that those listed above generate the best bang for the buck—but not all for the same reasons.

For example, the thruster and the snatch are optimal movements for generating absolute power. Elite CrossFitters can sustain output of about one horsepower for a full minute with these movements at the right weights (typically around 100 lb. for men). In contrast, the best CrossFitters can only generate about a quarter of that output with a minute of handstand push-ups or muscle-ups.

If we only considered power, we should conclude that abandoning handstand push-ups and muscle-ups in favor of snatches and thrusters would lead to better fitness. This, of course, is ludicrous. Optimized real-world competency requires proficiency in both handstand push-ups and muscle-ups. By specializing in the highest power moves and thus rejecting all inherently low-power functional exercises, we would improve power but not real-world work capacity.



Susanah Dy/CrossFit Journal

Power was important in the sandbag sprint at the 2009 CrossFit Games, but athletes also had to be good at low-power movements such as handstand push-ups and heavy deadlifts.

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Staff/CrossFit Journal

It's pointless to compare the power generated in Fran and Elizabeth. Both workouts are equally important for different reasons.

A second misguided application of power is revealed when you consider the fact that you could theoretically increase power without improving performance. This is unlikely to happen practically but is certainly theoretically possible. For example, imagine moving 100 25-lb. sandbags up a flight of stairs. You could, over time, gain 20 lb., which would increase the work performed during the task. If you then finished the task a little slower, you could actually see an increase in average total power output. In other words, you are demonstrating lower real-world capacity (taking more time to finish the task) but generating more physical power. This is not an improvement in fitness as we define it.

Apples and Oranges

Power is sometimes also used for comparative purposes, but these comparisons provide few conclusions. For example, who is fitter: the little guy with a better Cindy but slower Grace or the big guy with fewer rounds of Cindy and a faster Grace? Or which workout is better: Fran or Elizabeth (Fran having a much higher average power for most CrossFitters)?

Different workouts and different bodies are apples and oranges. Relative fitness and relative merit, in several ways, are artificial concepts, or at least limited to some predetermined normative value. It is not necessarily true that you should be able to definitively rank them.

Either way, if you just look at power, you'll get a skewed answer. Real-world abilities require more than just power output. They require power as measured through the productive application of force. In life, this power output requires skills (coordination, accuracy, agility and balance). Solely maximizing power in training without addressing the breadth of skills (many of which operate at a lower power output) doesn't translate into optimal real-world capacity.

Better, but Not Perfect

Fortunately, there is a very easy and effective way of maximizing the practical application of power and intensity for fitness: time your workouts, count your reps and know the weight of your barbells.

If you reduce the time of completion for your workout, your power output increases (assuming you stay the same height and weight). Reducing your Fran time is a legitimate, measurable improvement in your power, even if you have no idea exactly what that measured power output is in terms of foot-pounds per minute or watts.

If you increase the work completed in the same amount of time, your power output increases. Increasing the number of rounds of Cindy completed in 20 minutes is a legitimate, measurable improvement in power. If you complete Diane in exactly the same time but went from 185-lb. deadlifts to 225-lb. deadlifts, that is a legitimate, measurable improvement in your power.

These examples are actually better measures of real-world fitness than knowing the power output of the workouts because life requires the completion of tasks. The driveway has a certain amount of snow that needs to be moved. There is a fixed amount of time to move the greatest number of sandbags to the river before the flood. The groceries have to be unloaded from the car and brought to the kitchen. Fitness is the ability to accomplish the task at hand in the least amount of time.

An Easy Real-World Solution

Counting your reps, weighing your barbells, and timing your workouts is really all you need. If you complete the same workout in less time or do more work (reps) in the same time, you have increased the average power in real terms. No other data is required to maximize results.

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Many in the CrossFit community, including Coach Glassman, have dug into measuring the power outputs of different athletes in different workouts. The overwhelming conclusion of these analyses is that tracking times and loads is as much data as we need to develop elite levels of fitness. Secondly, these investigations concluded that calculating actual foot-pounds per minute didn't contribute any additional benefit toward that fitness.

In other words, cutting your Fran and Helen times, increasing your max deadlift and getting more rounds of Cindy or Mary is really all you need to know about power. Knowing that you can generate over 20,000 foot-pounds per minute in Fran but just under 10,000 foot-pounds per minute for Elizabeth provides no additional benefit (these are Greg Amundson's actual numbers, by the way).

This doesn't mean the CrossFitting nerds out there shouldn't play around with actual power calculations a bit. There are some interesting observations to be made. But beyond basic geeking out, you'd be hard-pressed to demonstrate improved results from the specific calculations.



About the Author

Raised in Atlanta, Russell Berger spent four years in 1st Ranger Battalion and saw numerous combat deployments. After starting CrossFit in 2004, he left the military, moved to Alabama and opened [CrossFit Huntsville](#). He currently splits his time between running his gym, training for the CrossFit Games (he won the 2009 Dirty South Regional Qualifier), writing for CrossFit, and spending time with his family.