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The Most Powerful Human Being in the Entire Universe

Lon Kilgore

For some people, hearing the words "the most powerful human" conjures up images of a spandex-clad superhero oozing muscles and capable of incredible feats of strength and speed. Or maybe it makes you think of a 248-pound fullback driving through a mass of bodies to the goal line. In any case, it evokes a figure who is strong and can move fast. And this is where we begin our quest to understand the critical physical ability of TMPHBITEU, which is the combination of strength and speed—or, more precisely, power.

Power is an easily understood concept and it all begins with doing work. But work here is not the daily 9-to-5 grind, it is the application of a force to an object with a resulting movement of that object. We can quantify work by knowing the mass of the object moved and the distance it moves:

$$\text{work} = \text{weight moved} \times \text{distance moved}$$

If I move ten pounds a distance of ten feet, I have done 100 foot-pounds of work. Pretty elementary. Work is a vector quantity, which means that it has both a direction and a magnitude. What it does not have is a time component. If I move that ten pounds ten feet in ten minutes, I have done the same amount of work as if I moved the ten pounds ten feet in ten milliseconds. Being able to do lot of work in a single effort is associated with being strong. Being able to do a lot of work in multiple repeated efforts is associated with having stamina. But how does work play into determining who the most powerful human is? Again we go back to our bag of physics equations and pull out the equation for power, which quantifies how much work we can do in a period of time:

$$\text{power} = \frac{\text{weight moved} \times \text{distance moved}}{\text{time it takes to move}}$$

This relationship between the work done and the time it takes to accomplish it means that the person who can do the most work in the shortest amount of time is the most powerful human on the team, on the loading dock, in the gym, in the factory, in the entire universe, or what-have-you. So, both concepts—work and power—are pretty easily understandable. But with such ease also comes a need for caution. There are two divergent

but related types of power that we must comprehend, for each type has a specific application and cannot be considered to be equivalent to the other, although it is quite tempting to do so (and many academics and fitness professionals fall into this trap of confusion).

The first type of power we'll consider is basically "burst" power—the ability to produce large single efforts of work in very short periods of time. If we consider this in the context of World's Strongest Man contests, it would be something like the keg toss, where the object is to throw a beer keg as high as possible in a single effort. In this instance, the athlete is increasing the force applied to the system in order to increase the distance the keg is thrown. The higher you throw the keg, the more powerful you are. For the power calculation to be greater, the force applied to the system has to outweigh the effects of the increase in flight time caused by a higher throw.

Another example of "burst" power is in the sport of weightlifting. Both the snatch and the clean and jerk lifts are done extremely quickly. In this case, because the distance between the floor and the overhead finish position for a given athlete is constant, the only way to increase power is to increase the force applied. Or we could decrease the amount of time the lift takes, but the magnitude of such a change in this context would pale in comparison to what is possible through increasing the body's ability to produce force. After all, the electrical impulses controlling the rate of muscle contraction already operate in a time frame on the order of milliseconds. While you can improve neural efficiency (cut the number of milliseconds it takes to signal the muscle to contract a tiny bit), you get a much bigger bang for your buck by increasing strength. Just look at the power formula above: if distance does not change and time is only minimally alterable, then increasing force is necessarily the best strategy for increasing power.

The second type of power we need to analyze is "sustainable" power. This is the ability to carry out lots of work in a longer, sustained, period of time. Using another strongman contest analogy, "sustainable" power is the ability to load a bunch of beer kegs onto a truck quickly. In this instance, a constant weight is being moved over a constant distance, so the only way to improve power is to reduce the amount of time it takes to complete the task. The faster you load the truck, the more powerful you are. This is also the type of power important in endurance sports, since races have set distances and competitors are moving relatively similar body masses. So, because force acts to move only the body and the distance of the race doesn't change, only the rate of work, or power output, is changeable and relevant to winning. Sustainable power is also relevant to the factory floor, the firehouse, the theater of combat, or any other environment where work rate over a finite period of time is important to success or survival.

Who is the most powerful human, the one who can clean and jerk 550 pounds in a few seconds or the one who can sustain 400 watts of power output over a 150-kilometer bike race?

So who is the most powerful human, the one who can clean and jerk 550 pounds in a few seconds or the one who can sustain 400 watts of power output over a 150-kilometer bike race? Burst power and the big clean and jerk are oranges, and sustainable power and fast bike races are lemons—similar but different. While their units of measure for expressing power generated are the same, they are used in different contexts and are trained in different ways, ways dictated by physiological and physical reality. So when we talk about power, we have to specify what we are talking about before we can categorize. We also have to know what type of power is important to us before we design a training program intended to improve it.

This raises the question "Which type of power is important to CrossFit?" The answer is easy: both. CrossFitters train with weights and improve their burst power. It's one of the key elements of CrossFit. CrossFitters also do metabolic conditioning and improve their sustainable power (stamina and cardio-respiratory endurance). Yet another brick in our foundation of fitness. Can we stratify these two entities' importance and figure out which is most important to the CrossFit system of training? Maybe, but it's really not an either/or game. It is my observation that the bulk

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of CrossFitters have a goal of increasing sustainable power to support real-world occupations or to support sports performance that occurs over varying durations (rather than specialized performances that entail a single Herculean effort or a single all-out sprint). So, in terms of outcome or application, sustainable power is likely the most important of the two types of power for most CrossFitters. However, in terms of training to reach that outcome, developing both types of power, burst and sustainable, is essential.

So how does one develop both burst and sustainable power? Better yet, if sustainable power is seemingly the primary functional goal of most CrossFitters, why do we even worry about burst power? Fair questions. Strap in for an explanation.

Let's tackle developing burst power first. Remember that burst power is improved most efficiently by increasing force generation capacity—in other words, by getting stronger. The most efficient way to get stronger is to use heavy weights, in multiple sets of few repetitions, while doing large-scale, multi-joint, free-weight exercises. If you could squat 125 pounds in 1.25 seconds before starting a program of weight training, and then twelve weeks later you could squat 225 pounds in 1.25 seconds, you increased your burst power capacity. You did more work in the same amount of time so power output increased. This is a fine result but how does this affect improving sustainable power? This is where it gets a little bit tricky in explanation.

Let's use an example from real life to try to shed a little light on this. Say you are standing on the edge of a hay field facing the arduous task of loading several hundred thirty-pound bales of hay onto flatbed trailers. Consider what it would be like to heft those bales of hay up four feet from the ground onto the trailer bed if you were capable of power cleaning sixty pounds. Moving the bale represents utilizing much more than half of your functional strength (remember that a barbell is built to be lifted efficiently, while a hay bale is not). Needless to say there would need to be lots of recovery time throughout the day and the pace of work would necessarily be a bit slow as metabolic demand from having to repeatedly recruit a high percentage of available muscle would outstrip the body's ability to supply a steady supply of energy.

Now, let's take that same hypothetical farmhand, you, and increase your strength to where you can power clean 180 pounds. The relative load that a hay bale represents becomes significantly less stressful, and loading it onto the trailer now requires only about one-sixth of your functional strength capacity. That lower relative load requires less muscle mass for task completion and a lower metabolic demand relative to your previously weaker condition. The result is the ability to load more bales more quickly than you could when you could clean only sixty pounds. So, developing higher burst power is a means to developing a higher sustainable power—and that is one of the ways conventional fitness programs fail. They associate improving endurance and sustainable power with unweighted, continuous, long-duration, low-power exercise. They ignore the easy observation that increased strength contributes to improved endurance. CrossFit does not make this error.

There is more to sustainable power that we need to discuss. Although stronger is always better, the ability to provide metabolic support at an advanced rate is critical to sustainable power. Think of it like this: if you put some old, partially charged batteries into a remote-control toy car it will move slower and for less time than if you put in a fully charged set of new batteries. For working muscles, stored fat, carbohydrate, creatine, and, ultimately, available ATP are the batteries that supply energy. The sedentary, untrained individual is always running on a partial charge. Appropriate physical training enhances the amount of these energy substrates stored in the muscle and thus increases the battery charge. What is the appropriate training? Met-con. CrossFit metabolic conditioning training improves the ability to do lower-force work (relative to maximal effort) at very fast rates, which necessarily improves sustainable power and does so far more efficiently than traditional endurance training.

So who is TMPHBITEU? Is it a burster or a sustainer? I've seen Anatoly Pisarenko, who holds the record for doing the heaviest clean and jerk in the entire universe, up close. I've seen Andrei Chemerkin playing with 240 kilos like it was a baby's rattle. I've seen John Godina throw a shot put farther than my wife can throw a baseball. These are monsters of burst power. But they are monsters who do little metabolic conditioning and who are not concerned with being physically prepared to produce sustainable power. I've spent many years working to make specialized athletes similar to those guys. Given their goals and training methods, even if you wanted to assess their sustainable power, you probably

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couldn't get them to do any exercise testing activity that took more than a few seconds.

My experience with monsters of sustainable power is more meager: a couple of All-American cross-country runners, a few elite-level road cyclists, a couple of track cyclists, a Channel swimmer, and a few other miscellaneous high-level athletes who needed serious sustainable power to compete well. In this vein, Lance Armstrong produced many many watts of power during the arduous hours of his long cycling races. His ability to maintain a high work rate for long distances made him an indomitable monster of sustainable power. If I actually knew the names of winners of the Boston or Olympic marathons, I could also point to them as monsters of sustainable power production.

But is there a monster division for the best of both worlds of power production? There might be a case made for a decathlete as a monster of mixed power production. But there are many other examples of strong people who do lots of work really fast but who do it in situations where measurements are neither done nor desirable. That makes this category very difficult to assess. On a recent visit to CrossFit San Diego I had the pleasure of meeting owner and Navy SEAL Eddie Lugo and seeing him do some weight training. He is one strong CrossFit guy who can do a lot of physical work fast. In my view, he is a monster of combined power. But he doesn't really care what I think about his power capacity. Where fitness and power matter really to him is in the special warfare environment. And there the only measure of the benefit of possessing both burst and sustainable power of importance is survival and mission success. Survival and mission success aren't variables we can or want to test in the lab or in competition.

So where does this leave us? Given that CrossFit training develops a balance of burst and sustainable power—that it "increases work capacity across broad time and modal domains," as Greg Glassman puts it—maybe TMPHBITEU is out there in the ranks of CrossFitters around the globe. And maybe, just maybe, the first annual CrossFit Games (June 30 – July 1, 2007) will be a first step in determining his identity.

Lon Kilgore, Ph.D., is professor of kinesiology at Midwestern State University, where he teaches exercise physiology and anatomy. He has extensive experience as a weightlifter himself, and he has worked as coach and sports science consultant with athletes from rank novices to collegiate athletes, professionals, and Olympians. In addition to publishing articles in numerous scholarly journals, he is co-author, with Mark Rippetoe, of the books *Starting Strength: Basic Barbell Training* and *Practical Programming for Strength Training*.