
THE CrossFit JOURNAL

End of the Line?

Is linear-progression strength training optimal for CrossFitters? Chris Mason doesn't think so and offers up a different method for building strength.

By Chris Mason

September 2010



R. Lucas/CrossFit

Linear progression is a system utilized by many CrossFit practitioners for the strength-training component of their overall regimen. It is a proven and effective method to increase one's strength, but is it the most effective method, and in particular, is it the most effective method for CrossFitters?

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The short answer is no, and the balance of this article will address why and offer an alternative system for optimized strength-training results.

Unsustainable Intensity

Linear progression as it relates to resistance training involves the progressive increase of loads in a straight-forward manner, hence the name “linear.” In other words, for a given exercise and prescribed number of sets and repetitions, the trainee will strive to regularly increase the loads used for their working (post warm-up) sets.

Let’s use the overhead press as an example. A trainee following a linear progression program might employ a 5x5 (5 working sets of 5 repetitions) format. Once the 5 sets of 5 reps can be completed with a given resistance, say 100 lb., the trainee will typically attempt to increase the load for his or her next session by a small increment (5-10 lb.). When the new load can be handled for 5x5 the weight is again increased, and so on for so long as the trainee can continue to do so.

The final statement in the paragraph above is the rub of linear progression. The program, while very simple and quite effective for beginners, is quickly exhausted of its effectiveness assuming one is training with the requisite intensity (the term “intensity” being defined in the classic weightlifting fashion as a percentage of one’s 1-rep-maximum lift) for building strength. The body’s response to resistance training, especially that of the high-intensity variety practiced with strength training, is one of fast adaptation initially, both in the form of contractile myofibril hypertrophy and neural adaptation to a given exercise.

Lean muscle hypertrophy quickly takes a back seat to neural adaptation, very likely due to the physiological “expense” of skeletal muscle (total caloric intake plays a part in the duration of the hypertrophy response, but I want to keep things as simple as possible for the moment). Increased skeletal muscular size is a tremendous burden on the chemical processes of the body, and the body seemingly does what it can to mitigate the amount of muscle added to deal with the stress of lifting heavy loads. Anyone who has trained with weights has experienced this overall phenomenon. It is generally called “beginner’s gains.”



D. Re/CrossFit

Linear progression works for a time, but as athletes become more experienced, progress often stalls and new approaches are required for success.

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Neural adaptation thus becomes the limiting factor with linear progression. Unlike with other forms of training (periodization, etc.), there is no real variation of the loads used from session to session. The trainee is working at a high intensity every training day. When the same movements are repeated each session (as is the case with most CrossFit linear progression practitioners) in this intense fashion, the nervous system quickly becomes overwhelmed in terms of its ability to continue to adapt. Much like the muscular system, there seems to be a point of no return or negative returns relative to the amount of high-intensity exercise the nervous system can tolerate.

The “fix” prescribed by the linear progression pundits for this rather rapid form of neural overtraining is to eat more and or take a break from intense strength training. Each of these solutions has problems. Excessive caloric intake leads to body fat and even potential health problems. It is only a temporary fix, as no amount of caloric intake can stave off neural overtraining for long. Time off is not really any better, as it leads to a detraining effect of one kind or another.

In fact, because skeletal-muscular recovery seems to be significantly faster than neural recovery, skeletal-muscular atrophy is a very real and common occurrence. This atrophy places the body in a literally weakened position that forces the nervous system to work even harder once one is back to training, and a yo-yo effect manifests itself. This is demonstrated millions of times per day throughout the world as well-intentioned trainees toil away with the same weights day in and day out. They used linear progression to get to a point, and no matter what they do they cannot get past it.

Managing Intensity, Building Strength

So, what is the fix? What form of strength training is optimal for the CrossFit practitioner?

The answer lies in a system of conjugate variation. The cornerstone of conjugate variation as taught by Louie Simmons of [Westside Barbell](#) is constant variation of exercises used to target given body parts or movements. So, for example, on the Westside maximum effort (ME) day for bench—where the lifters warm up to a 1-rep-maximum attempt (1RM)—Louie’s guys might



S. Dy/CrossFit

What strength program will help you lift this? If you're serious about training, you owe it to yourself to explore your options.



D. Smith/CrossFit

Unbridled intensity can lead to overtraining. Smart training with maximum intensity can lead to PRs.

floor press one week, board press the next, reverse band press the next, and then end the four-week cycle with full-range shirted bench presses.

Conjugate variety allows for repeated high-intensity training without neural overtraining for prolonged periods—even at the most elite levels of strength development. To help understand this phenomenon, one must know something of the science of motor learning. Motor learning involves skill acquisition relative to physical movement and how said skill may or may not transfer to other movements. One of the findings of motor learning is that physical movements which at face value appear to be very similar have very little skill transfer.

For example, the fastest runner in a straight line is not necessarily the fastest runner in a circle. Another example would be the skill of swinging a tennis racket. A great tennis player may be a very poor badminton player. Both sports involve swinging rackets, but the difference in the rackets and objects being struck makes the skill, or neural, requirements to play either sport vastly different.

This same concept is applicable to weight-training exercises. Even a minor tweak to a given exercise makes a significant difference to the nervous system. You see this concept in practice every week at Westside Barbell in Columbus, Ohio. As mentioned earlier, the Westside team switches main exercises for their ME days every week. Even alterations as seemingly minor as switching the bar used for squatting can make all the difference in terms of nervous-system recovery.

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D. Rey/CrossFit

For instance, Louie's team might use a straight squat bar to perform box squats with bands for ME day one week, then switch to the Buffalo Bar the next week while still doing box squats with the same band tension. Both are similar, nearly identical movements to the eye but are experienced very differently by the nervous system, thus helping to preclude, or at least mitigate, central nervous system overtraining.

Another major factor in the efficacy of conjugate training relates to its addressing of weak points. With the Westside system, this happens in two ways. First, the fact the trainee is switching ME exercises weekly helps to address weaknesses by the inherent differences in the movements themselves. For example, if one has a weak lockout on the bench press, a board press or floor press will help to address it. If hamstrings and gluteus muscles are a weakness in one's squat, the good morning can help to address it, and so on. Second, if conjugate variety is the cornerstone of the Westside system, then assistance exercises (or "special" exercises) are the mortar. Louie's Westside system specifically targets individual's weaknesses via the extensive use of assistance exercises. This results in an athlete who is stronger and less prone to injury.

Training Hard and Smart

Now that you know why I believe conjugate variety is superior, why is it not used more extensively for strength training in the CrossFit world? I think many CrossFitters are first introduced to strength training with a linear progression model that's simple and easy to understand. The fact the program works quite well for a period of time creates a false sense of faith in its efficacy. When it invariably fails the trainee looks to other variables to explain the problem (diet, supplements, rest, etc.). Those who are still progressing continue to spread the word about how wonderful it is, thus further confusing those who have stagnated. This cycle continues simply because the involved parties don't know a better way. My hope with this article is that it will be a catalyst for CrossFitters everywhere to open their minds to a superior method of strength training.

Ignorance to a better way can also manifest itself as a form of fear. I have often seen on the CrossFit forums the argument that Westside methods or other forms of non-linear training are too complicated for the beginner, that they are even potentially dangerous. Nothing could be further from the truth!

First, how complicated is it to train with one speed day (dynamic effort, or DE) and one ME day per major exercise (bench and squat) weekly? How hard is it to switch the ME exercise each week? I suppose there could be an argument that targeting weaknesses can be somewhat difficult, but with the glut of information available via the Internet, even that is not truly a difficult chore for the properly motivated individual. Furthermore, the percentages used for the DE days are quite straightforward. If you can't figure 50 or 55 percent of a given number, then perhaps you should work on your mind a bit more than you are working on your body ...

What really puts the "too difficult for beginners" argument to bed in my mind is that fact that Louie Simmons has taken several very young trainees (early teens) and turned them into world-champion powerlifters (while still very young) using his system from Day 1. If you want to toss out the world champions as genetic freaks, they can easily be replaced by an army of Simmons-trained young men and women who have improved their strength and athletic performance dramatically.

Louie's conjugate variety system works just as well for beginners as it does for elite athletes. In Louie's own words, "Why would someone want to learn how to train less than optimally?"

Why indeed?



About the Author

*Chris Mason is the co-owner of [AtLarge Nutrition](#). Chris has been involved with bodybuilding and powerlifting for over two decades. He is an accomplished writer in the genre, having published articles in **Athlete**, **Planet Muscle**, **Ironman** and **Powerlifting USA** magazines, as well as online. You can view several of his articles on his website [WannaBeBig.com](#). Chris currently resides in Charlottesville, Va., and makes monthly treks to Ohio to train at [Westside Barbell](#) with Louie Simmons. He is also a member of Louie's team for CrossFit Powerlifting Certs.*