

Crossfit – What are you trying to achieve?

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Today's article takes a look at the current High-Intensity functional training craze known as Crossfit.

Crossfit originated in the USA in 2000 and is promoted as a holistic exercise philosophy incorporating elements from high-intensity interval training, Olympic weightlifting, plyometrics, powerlifting, gymnastics, kettlebell training, calisthenics, strongman, and other exercises.

In principle, this training methodology seems sound except that within the range of exercises that participants are expected to undertake, there are many exercises that would be classified as highly specialised (Olympic Lifts) with a high injury rate factor (Plyometrics) which can be further exacerbated by adding excessive fatigue to the routine (High Intensity Interval Training).

Crossfit has generated a small but enthusiastic cohort of supporters and a recent systematic review and meta-analysis stated "that CrossFit practice is associated with higher levels of sense of community, satisfaction, and motivation". What this review didn't find was any significant results for improvements in body composition or health aspects.

This analysis also found that of the 31 articles used as part of this review, only 2 had a high level of evidence at a low risk of bias. Meaning that the majority (29) of the reviewed papers published on Crossfit are biased towards promoting the sport as achieving certain outcomes that were not scientifically significant.

Olympic Lifts

A key component of Crossfit is the use of Olympic lifts (including the Clean & Jerk, Snatch & Power Snatch).



These are highly specialised movements, that typically take many years of training to develop the correct motor patterns as well as the joint flexibility and strength to move into these extreme ranges of motion (under load) and not increase the possibility of injury.

A recent medical paper comparing Crossfit versus traditional weight lifting participants found that the Crossfit group was 2.26 times more likely to get injured performing these exercises than the weight lifting group.

The main areas of injury were shoulders (47%), lower back (38%) and hip region (9%).

This study further stated that *"the increased likelihood of injury may have less to do with the exercises involved with CrossFit and more related to the intensity with which the exercises are performed"*.

Performing Olympic lifts in a fresh state allows the participant to be largely free from both physical and mental fatigue, but under Crossfit programs, the participants are expected to complete often 100+ of these movements in a highly fatigued state making this exercise environment quite dangerous.

Lack of a coordinated first pull in both clean and jerk and snatch immediately places the



responsibility to successfully complete this lift on the lower back and upper body musculature (Shoulder joint in particular).

For those who have attempted heavy Olympic lifts, it is an amazing phenomena that a small weight increase (or increase in fatigue) can result in total loss of technique and lift failure (or a continued attempt to complete the lift with the load directed onto the lower back and shoulders).

Periodization

Another key aspect of programming to minimise injury and maximise adaptation is the periodization of the program being undertaken. This may be nothing more than combining easy and hard weeks all the way to collating total training loads from session to session to ensure that there is adequate progressive overload and associated recovery phases built into the routine.

Crossfit pays little attention to "traditional Periodization models" with the basis of planning being to provide constantly varied functional movements at high intensity.

There are potentially several issues with this approach, the first being that it is almost impossible to progressively overload specific physical attributes if you are constantly changing up the routine (never being able to compare apples to apples). If one week you are bench pressing, the next dumbbell pressing, the next weighted pushups – you are never able to complete a direct comparison of how you are actually progressing in any one exercise so how do you know if you are improving over time?

Also if you have a particular weakness, the best way of overcoming this weakness is to focus on a small group of specific exercises that target this weakness – this approach doesn't seem to be incorporated into traditional Crossfit programming.

An article by Greg Everett clearly articulated the issue:

"CrossFit is a somewhat nebulous program involving "constantly varied, if not randomized, functional movement performed at high intensity." This notion of randomness has become an eclipsing focus of many CrossFit athletes and trainers. Quite possibly this is because approaching training randomly effectively masks a lack of programming ability and gives one a false sense of programming expertise. Anyone can throw a list of exercises and numbers on a whiteboard; far fewer can create workouts that, over a given period of time, ensure an athlete accomplishes his or her goals."

I know of several colleagues who are avid Crossfitters and when asked how the programming is varied from week to week (specifically in terms of progressive overload), none of them are able to clearly articulate how this approach is being taken (if being taken at all). None of them record their workout loads (therefore making it impossible to know if they have done more or less over time – except for the memory that when they started they couldn't do a muscle up and now they can)!!

Central Nervous System Fatigue & Adaptation

There has been quite a lot of research completed on the effects of Central Nervous System fatigue and what this means for ongoing adaptation to training.

CNS fatigue can be defined as: *"a reduction in the activation of high level motor units"*. It is these high level motor units that contribute to both an increase in strength and hypertrophy of muscle.

If a training goal is to get stronger with concomitant hypertrophy, then training should be structured in a way to reduce the total amount of CNS fatigue experienced during this training.

CNS fatigue accumulates during sets of strength training, which prevents full motor unit recruitment from being reached despite reaching muscular failure.

Therefore, we can conclude that CNS fatigue develops to a greater degree when performing strength training sets of longer duration, such as that required when completing a Crossfit workout.

CNS fatigue is also increased when there is the use of aerobic exercise in the same training program as strength training (eg [Crossfit](#)).

That then raises the question, what adaptations can you expect when performing Crossfit workouts several times per week?

Early on you will of course develop better technique, improve your overall fitness and even put on a bit of muscle (as any increase in training stimulus will cause these changes). But as you continue to participate in these workouts over time the outcome is largely a "metabolic workout" where you burn a stack of calories, maybe develop an increased lactic tolerance but you will likely plateau on the strength, power and hypertrophy attributes you were hoping to gain.

You might ask, how is it that all these Crossfit competitors look so amazing if the above is



true? How can they carry such quality muscle with low bodyfat levels and be fit and strong at the same time?

You could ask the same question of other athletic endeavours like 100m sprinting – If you go to the track every day and run 100m as fast as you can, will you look like (and maybe perform like) Usain Bolt?

Or if you go to the gym and lift weights 3-4 times per week are you going to look like a professional bodybuilder?

Of course the answer is NO!!!

Crossfit competitors have developed their bodies to be able to complete a specific competitive crossfit routine as quickly as possible. The attributes needed to complete this task are significantly different to that which you will develop by completing a Crossfit workout a few times per week.

Power

The last aspect of the Crossfit phenomena I wanted to address is the belief that completing

Crossfit training over time will make you more powerful.

Power is defined as Work/Time or $\text{Force} \times \text{Distance/Time}$
(how much work you do within a specified time period).

The traditional view of power is the capacity to generate a force in a short time frame – typically less than 1-second (eg throw a weight or vertical jump (force generated in a short time period)).

Whilst performing any “power” activity (Olympic lifts, plyometrics) will develop an increased power level, due to the volume of repetitions undertaken there will be a quick stagnation in overall power development with Crossfit. It is a furphy to generally state that if you are able to complete more work in less time that you are more powerful (which is what has been stated by Crossfit advocates). This is like stating that a marathon runner who has run faster than his/her last time is now a more powerful athlete (based on the above equation this is true!!!).

SUMMARY

The goal of this article wasn't to state that Crossfit is not a valid, useful method of getting into shape. What I wanted to highlight is that there is quite a bit of commentary about the benefits of Crossfit that isn't backed up by the research.

Also the process of trying to lift heavy and/or fast weights whilst under high levels of fatigue will reduce the overall adaptation that you can expect to achieve from this type of undertaking.

Finally, if you accept that the main adaptation from undertaking Crossfit is a good metabolic (calorie) burn, then you will likely achieve your training goal.

If you would like to read more about the potential dangers of Crossfit check out a recent blog ([American v's Russian Kettlebell Swings](#))

Bibliography

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5826907/>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6505252/>

<https://www.catalystathletics.com/article/53/Plandomization-CrossFit-Periodization-and-Planning/>

<https://medium.com/@SandCResearch/why-does-central-nervous-system-cns-fatigue-happen-during-strength-training-e0af3f5e4989>

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