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Volume Training for “Goats”

Brian Wilson explains how increased time and reps—not frequency—have helped eliminate weaknesses in athletes at Potomac CrossFit.

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Photos courtesy of Nicole Bedard Photography

“Fitness is defined as increased work capacity over broad time and modal domains.”

—Greg Glassman

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Much has been said about muscular endurance, modal capacity and training weaknesses in CrossFit. What I'd like to cover here is just one tool that might help athletes and coaches quickly improve a distinct weakness.

This training technique—called volume training—has been used in various forms; it is characterized by specific and repetitive training for a weakness.

It could be fielding ground balls with a backhand technique in baseball, shooting free throws in basketball, or pressing to handstand in gymnastics. The goal is to develop **proprioception** and endurance—defined as the ability to reproduce a movement many times over or at length—in that specific modal capacity.

The inspiration for this method came from my time in the Marine Corps and is a bastardized version of the **Recon Ron Pull-Up Program**, which the Marines have used for years to prepare prospective officer candidate school enrollees for the pull-up portion of their physical-fitness test. Volume training is similar to the Recon Ron Pull-Up Program but increases time and reps while decreasing frequency of training.

This training method is designed to allow the athlete to practice the movement with near-perfect form, not to create a significant metabolic-conditioning response.

Volume training can be performed for any human movement, but at Potomac CrossFit we have found that upper-body gymnastics movements (e.g., handstand push-ups, pull-ups, ring dips, push-ups, muscle-ups) see the greatest relative improvement with this method.

However, any uncommon movement or modal weakness can be improved with volume training, including front levers, back levers, planches, pistols, double-unders, GHD sit-ups, rope climbs, etc.



Camille Leblanc-Bazinet's outstanding performances in the muscle-up/snatch WOD and handstand push-up/clean WOD during the 2010 Games gave her a huge bump in the standings.

A key concept to remember is the athlete should work at a sub-maximal effort. This training method is designed to allow the athlete to practice the movement with near-perfect form, not to create a significant metabolic-conditioning response.

By working on modalities in which the CrossFit athlete is weak, we can improve those to a degree that when reintroduced in a traditional CrossFit WOD, he or she will generate an improvement in metabolic capacity because the athlete can repeat the movement many times, and quickly, without reaching complete muscular failure.

I believe this principle is critical to understanding CrossFit programming in general and the reasoning behind volume training specifically.

Programming Volume Training

There are infinite varieties of time, reps and modal domains one can use volume training to improve. First, let us look at a common weakness among CrossFitters: the handstand push-up. We will look at a baseline template to improve that weakness and ways to measure progress and results.

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At Potomac CrossFit, we have found the greatest benefit from volume training is after a strength workout. If performed on the same day as a met-con, volume training should be done before the main workout, with careful attention paid to the total reps performed that are pushes, pulls, etc.

Volume training should be prescribed for athletes who have trained regularly for several months or years but still have one or two modalities that need improvement. While this plan might be of use for beginners, we have found the official [CrossFit Warm-Up](#) to be best for beginners.

It's important to have athletes test their single-set max of whatever movement(s) you will focus on. However, you and the athlete will be able to determine progress quickly from session to session, as shown below.

As a general rule, Potomac CrossFit prescribes 20-minute volume-training sessions twice per week for the average CrossFit athlete, with reps performed every minute on the minute. The goal is to work sub-maximally (not reaching muscle failure) and maintain a difference of no more than 2 reps from the first set to the last set.

A typical progression from the first to the fifth session for handstand push-ups can be seen in Table 1 below.

The athlete's goal is to continue to progress in total number of reps completed per session, while still not going beyond 2 in the difference between Minute 1 and Minute 20.

For athletes with above-average recovery abilities, Potomac CrossFit has added one extra volume-training session per week. Again, pay attention to how the athlete is recovering and how the sessions match up with the athlete's other workouts.

As the athlete progresses, our trainers have found that making the movement more difficult trumps additional reps. Timing will vary depending on the athlete. Qualitatively, we determine if the athlete is now capable within the modal capacity. If so, we next want the athlete to become dominant.

For CrossFit Games athletes, the importance of not only having no weaknesses but being strong in the movements that many are weak in has been a key to success each year.

Examples of the transition from capable to dominant are:

- Handstand push-ups on parallettes or rings.
- Weighted ring dips.
- Weighted muscle-ups.
- Weighted pull-ups.

On the other end of the spectrum, we can use volume training for athletes who don't have their first rep. For this we first use isometric and then eccentric movements

Minute	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Reps	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
Reps	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	32
Reps	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	38
Reps	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	43
Reps	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	50

Table 1: A five-session volume-training log for handstand push-ups.

within the volume-training template. An athlete who cannot perform a pull-up would use a flexed-arm hang of 3-10 seconds per minute and then progress to 1-3 pull-up negatives until achieving the first pull-up. Then the athlete would use a mix of pull-ups and pull-up negatives during the sessions.

Take care not to overtrain eccentric movements! Doing so can increase the risk of rhabdomyolysis for a newer athlete (or even an experienced athlete who is new to this training methodology).

(For additional info about minimizing the risk of rhabdo, please read [The Truth About Rhabdo](#) by Dr. Mike Ray, published Jan. 4, 2010, in the *CrossFit Journal*.)



Rich Froning Jr.'s significant lead going into the last event at the 2010 Games was erased by his lack of ability in the rope climb.

Time and Benefits

While the idea of shortening or lengthening these sessions makes sense to us based on our observations, the adage "if ain't broke, don't fix it" has been our guiding precept. So we've stuck with the 20-minute sessions.

Volume training has worked wonders for our athletes, including a lot of folks with significant "goats" that we've otherwise been unable to fix.

We would love feedback from the CrossFit community with respect to tweaks on this model.

Some of our athletes have tried to incorporate two deficiencies within one volume-training session, and we've seen both successes and failures within that model.

There also is a significant psychological benefit in volume training. Athletes do not, as a general rule, want to work on what they are bad at. But show them quick progress ... and they'll be itching to get back to the gym to get another rep, and another.

We've found that combining upper-body and lower-body movements does not seem to diminish progress within the template. So combinations such as handstand push-ups and box jumps, pull-ups and pistols, and ring dips and kettlebell swings have worked fine.

However, combining two upper-body movements seems to diminish progress in both movements. The guidance we give: stick to one movement most of the time. If you want to do an upper-body/lower-body volume-training couplet, that's fine. Just make sure you still are seeing progress in your top-priority movement(s).

Benefits of volume training for a coach or box:

- Easy to scale to individuals, so it can be performed as part of a warm-up or “cash out.”
- Significant rest each minute means athletes can cycle through equipment or space.
- Can be done in a group setting or individually.
- Easy to measure improvement. Progress is what your clients pay you for!
- Easy to supervise while other activities are going on in the gym.

The important theme to remember here is the idea of building modal capacity vs. improving conditioning.

“One consequence of a warm-up like this is that bigger numbers of pull-ups, push-ups, sit-ups, and other calisthenic movements will ensue. Before anyone gets 25 pull-ups, three sets of 10 will have to be a breeze,” Greg Glassman wrote.

The CrossFit Warm-Up is a wonderful tool to build modal capacity in gymnastics movements. However, nearly every athlete we have trained has had some issue that just doesn't seem to get better. If we see continued stasis in one or more modalities while others improve, shifting our focus to improve those capacities is what's required if the athlete wants to improve both modal capacity and conditioning.

There also is a significant psychological benefit in volume training. Athletes do not, as a general rule, want to work on what they are bad at. But show them quick progress, even if it's just one more rep than they did the last session, and they'll be itching to get back to the gym to get another rep, and another.

Surprising Side Effects

At Potomac CrossFit, we had an unexpected benefit of incorporating volume training into some of our programming. Since the time we opened, we've had athletes who have been injured (most of them outside the gym, with the majority of them injured through jogging and golf). I was responsible for giving these athletes online programming and had them come into the gym when they could to perform the WODs I had programmed specifically for them.

While these athletes saw some progress, several things held them up:

- I did a bad job of clearly showing the athlete he or she was improving, which the volume-training format does.
- I was cycling through too many movements in an attempt to keep it interesting rather than focusing on weaknesses.
- Their bodies were spending significant amounts on the healing process, limiting their ability to build strength, coordination, etc.

As a result, I had a significant number of injured athletes stop training with me.



Athletes dealing with injuries are some of the best candidates for volume training.

But once my fellow coaches and I read the *CrossFit Journal's* [Working Wounded](#) article through the lens of volume training and implemented a program built around it, we saw significant progress in athletes' modal abilities and excitement about training again even while severely injured.

**“The greatest improvement
in your overall fitness will
come from going headlong
at your weaknesses.”**

—Greg Glassman

We now have a significant number of athletes who not only are surviving injuries (stress fractures, severely pulled hamstrings, bulging discs, labrum tears, broken wrists) but are also thriving within our “Working Wounded” class, which we offer three times per week.

During these classes we do a warm-up, barbell/dumbbell max effort and volume training. A typical series of classes for an athlete with one usable leg is:

Day 1

3-3-3-3 seated dumbbell presses

Ring-dip volume training

Day 2:

3-3-3-3 suitcase deadlifts

Pistol volume training

Day 3:

3-3-3-3 bench presses

Pull-up volume training

By seeing significant gains in gymnastic movements each week, athletes are energized and excited about the training they can do instead of disappointed about not being able to participate in the WOD. Most of them want to stay in the Working Wounded class longer than necessary because they want to be able to crush their non-injured fellow athletes in upper-body gymnastics movements.

A significant number of athletes continue to make progress on their “goats” by simply hitting movements frequently enough to make progress, but not so frequently that they get overuse injuries. However, either psychologically or physically, there is a large swath of athletes who need tools to make measurable progress on their “goats,” improve their fitness and stick with a fitness program.

I hope volume training can be that tool for your box.



About the Author



*Brian Wilson is a captain in the U.S. Marine Corps Reserve. He holds a mechanical-engineering degree from the U.S. Naval Academy and is a student at St. John's College Graduate Institute in Annapolis, Md. He is co-owner of [Potomac CrossFit](#). He doesn't have a Facebook account, and his favorite movie is **Fletch**.*