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THE
CrossFit JOURNAL

YOU DON'T KNOW SQUAT

CrossFit athletes sometimes look to squat programs to increase strength—but are they effectively targeting weaknesses or merely feeding the ego and sacrificing general physical preparedness?

BY HILARY ACHAUER



Courtesy of Zach Even-Esh

Former wrestler and bodybuilder Zach Even-Esh warns against jumping into just any squat program. His advice is to find the one that suits your specific needs.

The first squat program Aaron Straker tried was the three-week Smolov Jr. cycle in March 2014. His goal was to build strength after an Achilles rupture.

The cycle was so successful Straker decided to try the full 13-week Smolov cycle later that same year.

“It just buried me,” said Straker, who has been doing CrossFit since 2010 and competed on a team at the 2014 Southern California Regional.

“It gets really, really heavy, and that just ruined my knees. My knees were killing me. My hips felt shitty. It was very hard to keep up with,” he said.

The 6-foot, 200-lb., 27-year-old Straker didn’t finish the cycle.

“The weights got too heavy,” he said.

Squatting is an essential exercise and the foundation of many movements in CrossFit. However, as with most things in life, more is not always better.

Ultra-intense squat cycles like Smolov have a specific purpose, they’re designed for a certain level of athlete, and they aren’t one-size-fits-all solutions. For CrossFit athletes—whose goal is improved health and fitness—a thoughtfully designed, constantly varied program and good coaching are enough to ensure athletes are increasing strength while maintaining other elements of fitness such as cardiovascular endurance, stamina, balance, coordination and agility. This has been proven countless times around the world as athletes improve 1-rep-max numbers while reducing times on benchmark workouts such as Helen and Nancy.

Squat programs, with their promise of massive gains, are always tempting. But are they worth it? What type of athlete can benefit from a squat program and who should avoid them?

Expert coaches from a variety of disciplines—Olympic weightlifting, powerlifting, strength and conditioning, and CrossFit—weigh in on the squat-cycle trend and offer their analysis.

Form First

If you’ve spent any time in a CrossFit gym, you’ve probably seen them off in a corner, plates piled on the bar, squatting and grunting. Or maybe you’ve seen someone on social media talking about the gains he or she made following a [Hatch cycle](#), a [Wendler 5-3-1](#) or even the [13-week Smolov program](#).

There’s nothing wrong with any of these programs, but they each have a specific purpose and—more importantly—they are not for everybody.

A former wrestler and bodybuilder, Zach Even-Esh is the founder and owner of [Underground Strength Gym](#), with two locations in New Jersey. Most of the members are high-school wrestlers, swimmers, fencers, soccer players, baseball players and martial artists. He’s also the head strength-and-conditioning coach for the wrestling team at Lehigh University in Bethlehem, Pennsylvania.

“The best program is the one that’s matching what you need biomechanically, physiologically and psychologically or emotionally. There are so many variables to it,” Even-Esh said. “I don’t like telling people, ‘You must follow this program,’ because it’s so hard unless I see you in person and watch you move.”

“The best program is the one that’s
matching what you need biomechanically,
physiologically and psychologically.”

—Zach Even-Esh

Even-Esh said he assesses every athlete who comes through the gym, noting mobility, mindset and goals. It’s only then he feels comfortable prescribing a program.

He believes squatting is essential, but first everyone must learn how to squat correctly.

“It is amazing how many 12-, 13-, 15-, 18-year-olds can’t do a body-weight squat without their knees collapsing, without their feet collapsing, without their lower back collapsing,” Even-Esh said.

“What the fuck are you doing? You look like you’re 90 years old squatting. That person cannot go on any Smolov, Westside, squat every day—none of that shit is going to work with that kid. What that person has to do is work body-weight squats of various positions because your spine is not going to blow out with your lower back rounded with a body-weight squat,” he said.

Even-Esh points out that many high-level athletes spend a great deal of time on mobility. For the rest of the population, whose hips and backs are tight from sitting at a desk all day, a heavy squat program might do more harm than good.

“We need to give them different squat variations that fit their body that eventually allow them to perform a squat below parallel with a neutral spine and all that good stuff,” Even-Esh said.

Some squat variations he likes—as alternatives to straight-bar squats—are safety-bar squats, Zercher squats, goblet squats with a kettlebell, squatting with a sandbag or squatting with various foot positions.

“Everybody is not capable of doing that one style of squat. We have to do things that are better for one person rather than fitting everyone in the same thing,” Even-Esh said.

Mike Robertson owns [Robertson Training Systems](#) and Indianapolis Fitness and Sports Training in Indianapolis, Indiana, where he trains everyone from office workers to professional athletes.

His philosophy is to use the simplest program until it’s no longer effective.

“If you follow a Wendler (program) ... he only squats once or twice a week. I’ve seen people get strong on that for years,” Robertson said.

Indeed, it’s likely many of those who gravitate toward squat programs are not truly stalled but rather looking for faster gains or a different style of training. Some need bands and chains, and others clearly don’t.



Mike Burgener of the CrossFit Weightlifting Trainer Course advises athletes to pay attention to their bodies and not get married to percentages calculated from a 1-rep max.

Stacey Pryce

Robertson said an aggressive squat program would be for a high-level intermediate athlete who has stalled out or an advanced athlete who needs that volume to continue to see improvement. Robertson has coached a handful of people who have had success with some of the base-level [Sheiko programs](#). He's also worked with two or three people who have dabbled in Smolov, and they saw success as well.

However, Robertson said if he had never seen an athlete move, he would "absolutely not" prescribe a squat program for someone.

"So many people need almost like a clean-up period, where we get them squatting and moving well before we start introducing more volume and intensity and more frequency into their programming," Robertson said.

He often takes three to six months to get a person moving the way he wants. Although they were held back at first, many of his athletes find rapid improvement when they do ramp up the weights because their body is so much more efficient.

"They aren't fighting themselves to complete the movement," Robertson said.

That's not to say athletes shouldn't squat until form is absolutely perfect. But athletes who want to ramp things up significantly need to ensure a foundation is in place. That progression of mechanics-consistency-intensity has always been part of the CrossFit progression, and it's unlikely any athlete—powerlifters included—can ignore it when planning to hit multiple sets of 4 reps at 95 percent of a 1RM, as the Smolov program prescribes at certain times.

Olympic Lifting and Powerlifting

There are athletes for whom squat cycles are important and effective. A specialist in Olympic weightlifting must have strong legs and hips, and one of the best ways to build those muscles is through squatting.

Specialization is very different than training for general physical preparedness, though the latter provides a great foundation for the former. But when an athlete makes a decision to specialize—focusing exclusively on the clean and jerk and snatch, for example—he or she must realize other aspects of overall fitness will suffer. And that's fine, as long as the athlete is making that decision consciously. For those specializing in lifting heavy barbells, squat cycles are all about timing, top coaches said.

"The type of squatting—back squat, front squat, overhead squat—really depends on the athlete and the time of the year that the athlete is going to be training," said Senior International Weightlifting Coach [Mike Burgener](#), head coach of the [CrossFit Weightlifting](#) program.

"The type of squatting—back squat, front squat, overhead squat—really depends on the athlete and the time of the year that the athlete is going to be training."

—Mike Burgener

"If an athlete needs to gain a lot of weight, and he's in the offseason, I don't hesitate at all to follow Gayle Hatch's squat program. I think that's an outstanding program. It's a back squat, front squat—it's basically two days a week," Burgener said.

Olympic weightlifters are training to perform single reps at the heaviest load possible, so Burgener said he doesn't like to have his athletes do more than 3 reps in training sets.

He likes 10 sets of 3 reps of front and back squats, about twice a week, increasing the weight gradually.

"I'm getting a lot of sets and reps. By the time you're getting to the eighth and ninth set, you're seeing the white buffalo in the sky," Burgener said, referencing how intense effort sometimes makes weightlifters "see stars."

"Once we get up to that 83 or 84 percent level, we start bringing down the sets. But I can run that program for eight to 10 weeks, and for me I've probably had the best success for that kid that needs to get strong with that program," he said.

One mistake Burgener sees frequently from CrossFit athletes is they get too tied into building percentages off their PR numbers. He thinks CrossFit athletes need to take into account how their body is feeling on a particular day and make sure their squatting percentages reflect that.

“(If) you’ve just had your ass handed to you by doing Grace, or doing other exercises, ... that 80 percent today might only be 55 or 60 percent. And you’ve got to know that and live with that and be smart with that,” Burgener said.

He said the CrossFit Games athletes he’s worked with are in tune with how they’re feeling on any day, which is what separates them from their competition.

Burgener said that’s the beauty of working with a coach.

“People call me up and say, ‘Can you write me a program?’ I can pull programs out of my rear end. I could put 10 people in a line, put them on the same program, and that program might work for one. Everybody has a different need. Everybody has different requirements,” Burgener said.

“Every athlete has a different requirement, and if you have a coach who is there with eyes on and hands on, you are in a better situation.”

[A.J. Roberts](#) knows a few things about squatting. A two-time world-record holder in powerlifting—with a 1,205-lb. squat, a 910-lb. bench and an 815-lb. deadlift—Roberts is now part of the [CrossFit Powerlifting Trainer Course](#) staff.

“Squatting multiple times a week, there’s an immediate benefit in strength gains, but when they return to their regular programming, those strength gains don’t tend to last,” Roberts said.

“If you wanted to get your squat up, you would have to accept that everything else is going to suffer because of it,” he said. Roberts said there are exceptions to the rule, such as four-time CrossFit Games champion Rich Froning, who has an exceptional ability to recover.

“(For) the majority of people, squatting every day is going to tear them apart. Their body won’t be able to handle it ... and if they do, it’s a short period of time. (Their) squat will go up, and (their) conditioning will go down, and then they will get the conditioning up and their squat will go down,” Roberts said.

After retiring from powerlifting, Roberts turned to CrossFit. Once Roberts focused on overall fitness, he improved his mobility, slept better, lost weight and had more energy. He could no longer squat 1,000 lb., but he didn’t have to take naps to get through the day. (Read more in the [CrossFit Journal](#) article “C2B for A.J.”)



Courtesy of A.J. Roberts

If you focus on your squat, other areas of your fitness will suffer, said A.J. Roberts of the CrossFit Powerlifting Trainer

Roberts said hardcore squat programs remind him of the Bulgarian system, in which all athletes endure the same brutal training regime. Those who survive go to the Olympics. Most get injured or drop out.

Roberts, now powerlifting again, follows the Westside Barbell Conjugate Method, which, like CrossFit, is based around the idea of varied movements. In the conjugate system, athletes are constantly rotating the lifts they emphasize during certain periods. All the while, they’re applying different stimuli designed to eliminate the weak links in the chain and drive maximum numbers up. The Conjugate Method was developed for absolute strength in powerlifting, but it’s not dissimilar to CrossFit principles that allow athletes to achieve impressive levels of overall fitness.

“To me, constantly varied means you avoid injury to the ... exact same area of the body. I believe getting strong from head to toe is key, and that transfers over to performance a lot better than just focusing on one lift,” Roberts said of the Conjugate Method.

Westside lifters squat regularly, and while their training is organized into a program, variety is key. Lifters will perform a number of variations of the standard barbell back squat: They’ll squat to boxes of varying heights—or they won’t—using a host of different bars and forms of resistance (including bands and chains, aka “accommodating resistance”). Reps and sets and percentages are programmed to achieve the desired results. The list of combinations is endless, and movement selection is determined by individual needs: “Select exercises that address your particular problems,” Westside Barbell founder Louie Simmons wrote in “The Westside Barbell Book of Methods.”

“I believe getting strong from head to toe is key, and that transfers over to performance a lot better than just focusing on one lift.”

—A.J. Roberts



Courtesy of Power Keg CrossFit

At Power Keg CrossFit, owner Adam Babin (right) began incorporating a squat cycle into regular programming.

When Roberts was training for his 1,205-lb. squat, he did a squat cycle, and he recommends one for anyone wanting to hit a certain number on the squat. But, he cautions, the gains are not sustainable.

Roberts said Simmons—who created the Conjugate Method—often says, “Why start something you are going to have to change?”

“You master the movement by mastering mobility, flexibility and getting stronger,” Roberts said.

“That’s a more long-term solution. Yes, you can get stronger quicker, but it doesn’t last in my experience,” he said.

Squat Cycles and CrossFit

Although squat cycles don’t make sense for most average CrossFit athletes who need a broad approach to overall fitness, Eric O’Connor, a CrossFit Level 1 Certificate Course leader, a Level 4 CrossFit coach and head coach at [CrossFit Park City](#), said there is one very important reason for a CrossFit athlete to undertake a squat program on top of regular programming.

“Let’s face it—it’s fun,” O’Connor said.

O’Connor said almost no average CrossFit athlete needs to go on a specific squat program; however, if someone in his gym approaches him about doing a squat program, he’ll first ask why.

“If the answer is, ‘I want to get stronger and it’s fun and I want to do it,’ then I’d rather ... help them out with that than them try to do it on their own, because at least then I can modify and moderate the volume,” O’Connor said.

He said he has noticed an increase in the number of people who approach him about wanting to embark on a squat program.

“I think people see the high-level Games athletes, they see the kinds of weights they are throwing up on social media, and I think they think that’s something that needs to be done. For most people that’s not true,” O’Connor said.

“I do think a squat program can help with the Olympic lifts, but only if your technique is solid. For most people, (if) they make improvements in technique, they see improvements in lifts and met-cons and everywhere else,” he said.

He said he’s seen people going through a squat program, and although their squat gets heavier, he doesn’t often see those numbers maintained once they come off the program, much as Roberts said.

There is a difference between bias and targeting. A bias is when an athlete focuses on one aspect of fitness at the expense of general physical preparedness (GPP). Targeting allows an athlete to focus on a weakness until it isn’t an issue anymore and he or she can target another weakness. With a bias, the focus will continue regardless of improvements.

“There’s nothing wrong with bias,” Chris Spealler said in a [Coaches Prep Course video](#). “The problem occurs when people start to confuse biasing with being superior to GPP.”

Specializing, or having a bias in your training, will impact overall fitness. A squat program, which by its very nature demands a focus on strength, will have a negative impact on other areas of fitness.

Targeting is focusing on weaknesses within the constantly varied framework of CrossFit. For example, if your weakness is strength, you might choose to load up the barbell during a conditioning workout. If running is a weakness, you might go to the track once a week. However, good programming, with a mix of heavy days, gymnastics and conditioning, can eliminate the need for targeting in most athletes.

“If you program well ... no one in your gym is ever going to have to target or bias,” Spealler said in the video.

“If someone is looking to increase their fitness, to increase their overall work capacity,” O’Connor said, “we just have this set-in-stone standpoint that doing constantly varied functional movement at high intensity helps increase strength along with everything else.”

“The problem occurs when people start to confuse biasing with being superior to GPP.”

—Chris Spealler

An athlete could certainly choose to specialize by focusing on a squat or strength program, but any type of specialization will affect overall fitness for CrossFit athletes. Anyone embarking on a squat program should be aware of the tradeoff.



Eric O’Connor said the average affiliate member does not need a squat program, but some high-level athletes will benefit from focused strength work.

Some CrossFit affiliates, such as [Power Keg CrossFit](#) in San Diego, California, have found success incorporating a squat program into their programming.

Adam Babin, owner of Power Keg, said coaches programmed a Smolov Jr. cycle before the CrossFit Games Open.

For three weeks, members deadlifted and front-squatted four days a week, followed by a conditioning workout. Babin said people started feeling burnt out after only a week of this routine, but knowing there were only two weeks left, they kept working.

“Everybody gained an inch and half on their quads,” Aaron Prenger, one of the coaches at Power Keg said, joking.

“Some girls had to buy new pants,” Babin said.

Babin said he thought the most important benefits were psychological.

“I think people learn to push themselves even further (because of the cycle) when they might not have before, because they got so comfortable doing it,” Babin said.

Without a basis for comparison, it’s impossible to know if the program worked better than any other, and without extensive data, we can’t determine exactly how the focus affected overall fitness. But it’s clear that affiliate owners who choose to experiment should always evaluate and learn from the results of their programming, as detailed in the CrossFit Journal article [“Tinkering Trainers.”](#)

Ray Regno is owner of [CrossFit Stronghold](#) in San Diego, California, and part of the [CrossFit Mobility Trainer Course](#) staff.

He said the biggest problem he sees is when athletes add on a squat program in addition to their gym’s programming.

“I’ve seen people overtrain at good gyms with good programming because they are adding in other stuff and not recovering,” Regno said.

This can happen even without any weights.



Alicia Anthony

CrossFit Stronghold owner Ray Regno said regular CrossFit programming is more than enough for the average Joe.

He had one member of his gym embark on a 30-day air-squat program. The program starts with 50 squats the first day and increases until the last day, which peaks at 250 body-weight squats.

“I had one lady—she was the only one who finished the challenge over the month—and her squats looked really great until Week 3, and after that ... she was wrecked for months, just from body weight,” Regno said.

“A lot of people are limited more by their skill than their actual strength. For the average Joe, CrossFit is more than enough to get them stronger and more functional.”

Consult a Coach

While some CrossFit affiliates address the need to squat through constantly varied programming that includes heavy squats regularly, other affiliates work a strength cycle into their programming, sometimes for fun, sometimes to target a general deficiency in their athletes. Front squats and back squats build overall strength and help with more explosive Olympic weightlifting movements. Squatting is difficult and incredibly effective—when used correctly.

Coaches from all areas of strength and conditioning and fitness agree any athlete considering starting an extracurricular squat program should consult with a qualified, hands-on coach who can evaluate the athlete’s individual needs. Embarking on an



Alicia Anthony

Ray Regno said he sees athletes make the mistake of layering a squat program onto their affiliate’s program. This can lead to burnout, he said.

aggressive squat program on your own, without the watchful eyes of an experienced coach, can lead to overtraining, injury or dramatic decreases in overall fitness.

In CrossFit, the goal is general physical preparedness. This means not training for a 4-minute mile or an 800-lb. back squat but rather the best of both worlds: a 5-minute mile and a 500-lb. back squat. While only some of us will achieve any of these numbers, the concept is the same, and the latter combination—representative of truly elite overall fitness—is more attainable than anyone ever thought.

Specialization has a price, and improved performance overall is best achieved by paying attention to all areas of fitness. ■

About the Author

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THE CrossFit JOURNAL

Outside Influence

Researcher Gabriele Wulf and CrossFit trainers explain how external cues can help athletes move better.

By Emily Beers

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Shaun Cleary/CrossFit Journal

Pat Barber is a member of CrossFit Inc.'s Seminar Staff and part of the coaching-development team at NorCal CrossFit.

He was tired of watching Jim round his back during a deadlift. He had tried every cue in the book to fix the problem.

But Pat Barber found his client was stubborn and always seemed to oppose his coach's requests. This time, Barber—a longtime member of CrossFit Inc.'s Seminar Staff—tried a different approach.

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Shaun Cleary/CrossFit Journal

Pat Barber (third from right) is unafraid to try creative cues to get his clients to move better.

“So I said, ‘Jim, this next one, round your back on this deadlift,’” Barber said. “And then he’s like, ‘Screw you, Pat,’ and he keeps his spine neutral suddenly.”

When Barber facetiously told his client to perform a deadlift incorrectly, he wasn’t worried about sounding smart or impressing Jim with an articulate cue or his long list of coaching credentials.

Instead, Barber had one mission: He wanted Jim to keep a neutral spine. In that moment, a seemingly incorrect cue—“round your back”—was the right one to achieve the goal, Barber explained.

This approach is straight out of the “[CrossFit Level 2 Certificate Course Training Guide and Workbook](#)”:

“Any cue that results in improved movement mechanics is successful and therefore, a ‘good’ cue. There is no specific formula, format, or rules to follow for cues, and their value is based on the result. Cues are not meant to accurately describe correct mechanics in a movement, and therefore, should not be judged based on technical

accuracy. Rather cues are used to help the athlete execute correct mechanics.”

Barber said being able to adapt your coaching commands to help a client move better is what sets good coaches apart from great ones. Echoing the Level 2 material, Barber said coaches should be less concerned about finding the most theoretically perfect coaching cue and more focused on discovering a way to help their athletes learn skills and move efficiently.

Similarly, most clients don’t care what their coach scored on his or her biochemistry or anatomy final exam in college—or if he or she went to college at all.

“Trainers may also rely on more technical language in their cues (i.e., ‘You are losing your midline!’), which assumes the athlete has a significant amount of fitness-related knowledge. While such language may give the appearance of being more technical (and perhaps an attempt to be more intelligent), it is at best a vague verbal cue. Cues should be kept to simple language that is easily understood by anyone,” according to the Level 2 handbook.

Knowledge of which muscles are flexing and which ones are extending provides only a lens for your own understanding, Barber explained.

“Cueing an athlete to move well is completely independent of that,” he said.

This usually means a 52-year-old accountant who is new to CrossFit will tune out when asked to “focus on the psoas” during a couch stretch. And cueing a group of athletes who don’t know their quads from their hamstrings to “activate the glutes” is sure to create blank stares. But when you tell a person to squeeze his butt cheeks as if someone were trying to stick a pencil in his bum, he’ll understand the cue, maybe let out a laugh and instantly respond by squeezing the glutes.

After 11 years of CrossFit, Barber has learned there is no such thing as the foolproof cue.

“The best cue is the one that works,” he said. “It doesn’t matter if you read it in a book or made it up on the spot.”

“Any cue that results in improved movement mechanics is successful and therefore, a ‘good’ cue.”

—“CrossFit Level 2 Certificate Course Training Guide and Workbook”

External vs. Internal Focus

While a foolproof cue might not exist, Gabriele Wulf, a researcher from the University of Nevada, Las Vegas (UNLV), has devoted nearly two decades to discovering how human beings best learn movements.

Wulf became interested in the topic when she was learning to windsurf in the mid-1990s. Before hitting the water for the first time, she turned to a magazine with an instructional article containing careful details about where

to place her feet and hands and how to shift her weight and flip the sail.

“I studied the magazine article and tried to do everything right, and it didn’t work very well,” Wulf said.

After a frustrating afternoon, she decided to scrap everything she had read and focus on the board instead. That simple change brought her instant success.

Since Wulf’s experience windsurfing, her career has been dedicated to unearthing what people should focus on when they’re performing physical skills. An article published in 2013 in the [International Review of Sport and Exercise Psychology](#) detailed her findings over the last 15 years.

Wulf’s research suggests people learn and retain skills more effectively when their focus is external as opposed to internal. This means when people are cued to focus on a movement’s effect or intended outcome (external focus), they learn and develop consistency with physical skills more effectively than when they’re tasked to concentrate



Courtesy of Gabriele Wulf

Gabriele Wulf struggled to learn to windsurf until she moved her focus from her body to her board.



Emily Beers/CrossFit Journal

Verbal cues often work very well, but great coaches also use tactile or visual cues to get athletes to move better.

on how their bodies are moving in space (internal focus), Wulf explained. For example, when an athlete is setting up for a back squat, it might be better to cue him to “push the bar up with your shoulders” than to “activate your traps.”

Cueing an athlete to focus on the outcome of the movement—external focus—usually means directing his attention to a piece of equipment or an area in space away from his body, Wulf said. For example, Wulf said if you’re teaching someone to golf, his performance is better when you ask him to focus on the swing of the club, the club face or the intended ball trajectory as opposed to cueing him to think about his arms, his wrists or the angle of his feet. Or when you’re teaching someone how to shoot a free throw in basketball, it’s best to cue the athlete to concentrate on the target—the hoop—rather than bogging the athlete down with internal details, such as how high his “shot pocket” should be in relation to his face.

“Or when you ski or rollerblade, for instance, and you focus on your knees and your feet, it’s less conducive to good performance. But if you focus on the skis, or the rollerblades, people learn better,” Wulf said.

When it comes to cueing for body-weight gymnastics movements, Wulf explained cues need to be creative because the movements don’t involve focusing on a physical object like a windsurfing board or skis.

One study she conducted involved acrobats who were tasked to perform a 180-degree turn in the air.

“We put a marker on the chest and we asked them to pay attention to the direction the marker was pointed,” Wulf said.

Focusing on the mark on the chest allowed the athlete to have greater body awareness in the air and successfully complete the 180-degree turn, Wulf explained.

When it comes to a simpler gymnastics movement such as a handstand, Wulf suggested telling the athlete to focus on the pressure he should exert into the floor as opposed to asking the athlete to activate his shoulders when he’s upside down.

From golfing and skiing to rollerblading, swimming and gymnastics, Wulf is convinced people learn and perform better when they’re given externally focused cues. This is the case for any physical task, she explained.

“Essentially, it’s a psychological phenomenon. . . . (An athlete becomes) less bogged down with all the little details, and it allows you to just focus on one thing,” Wulf said.

How She Got There

Through her research, Wulf has examined different general physical skills in relation to external versus internal focus. Specifically, she has studied balance, accuracy and movement efficiency.

In each study, participants were divided into groups. One group was given external cues, while another was given internal cues.

The study that tested for balance used a ski stimulator. Participants were asked to focus on their feet or on the pressure they were exerting on the wheels of the platform they were standing on. Those given the external coaching cues—focusing on the pressure being exerted on the wheels—demonstrated more effective balance than those asked to focus internally.

Other studies that tested for accuracy asked participants to perform various tasks, such as throwing darts and Frisbees or shooting basketball free throws. Meanwhile, studies that tested for movement efficiency looked at sprinting, swimming and rowing, as well as a vertical jump and a standing long jump.

During a study on vertical and long jumping, participants jumped higher and farther when their focus was external, and the right muscles also fired as they jumped—meaning their movement efficiency increased, too, Wulf explained.

“When you focus externally, movements are more automatic. And you don’t recruit the wrong muscles. You end up recruiting the necessary motor units or muscle fibers,” she said.

Wulf and her colleagues were able to measure jump efficiency by looking at an athlete’s maximum force production, which increased with external focus.

“The production of maximum forces requires an optimal activation of agonist and antagonist muscles, as well as optimal muscle fiber recruitment. Unnecessary co-contractions, imperfect timing, and/or direction of forces would result in less-than-maximal force output,” Wulf wrote in the article [“Attentional Focus and Motor Learning: A Review of 15 Years,”](#) published online in 2012.

She explained her findings don’t just apply to skill acquisition. They also apply to skill retention. Many of her studies have involved testing and re-testing athletes. Upon re-testing, athletes who were given external focuses retained their skills—even without further instructions—more often than those given internal focuses, Wulf said.

Greater retention, Wulf explained, means her external-focus theory applies to both beginners and more experienced athletes. One study found intermediate and expert swimmers with multiple years of competitive swimming experience also benefited from external focus.



Colleen Baz/CrossFit Journal

Kelly Brown often works with children and has found they respond very well to external cues.

Although her research is widely accepted in motor-behavior literature today, Wulf said the majority of coaches in different sports continue to cue their athletes with internally focused cues.

“When you focus externally, movements are more automatic.”

—Gabriele Wulf

“A central question for any athlete or coach is: How can skill learning be facilitated, and how can performance be optimized?” Wulf asked in “Attentional Focus and Motor Learning.” The article went on to cite the 2010 study “[Focus of Attention and Verbal Instructions: Strategies of Elite Track and Field Coaches and Athletes](#),” which suggested 84.6 percent of national-level track-and-field athletes said their coaches’ cues were mostly about body and limb corrections.

This gap between what her research shows and how coaches cue athletes in the real world should be bridged to help athletes of all levels maximize their performance, Wulf said.

“It makes so much sense to simplify (cues),” she said.

She added: “If you find the right instructions, they’ll be more successful.”

Putting It Into Practice

Kelly Brown is a CrossFit Kids Trainer Course coach and the owner of CrossFit Agoge in Montrose, Colorado.

“My life’s work has been getting kids to move,” Brown said, “on both ends of the health-wellness spectrum.”

Brown works with generally healthy, injury-free children at CrossFit Agoge, but she’s also a pediatric physical therapist and has worked with both injured and disabled children.

Children learn movements more effectively when they’re cued using words and concepts to which they can relate, Brown has discovered. Usually this means externally focused cues.

“Asking people to activate muscle groups tends not to work unless they have a real good idea of human anatomy,” said Brown. She noted that children do not. “So giving them something they can visualize, or an object they can figuratively steer toward, (works better).”

Instead of telling children to keep their elbows up, for example, Brown might say something like, “Pretend you have laser beams in your elbows and you’re trying to shoot laser beams across the room.”

Or if a kid is bottoming out during a squat because he’s not keeping tension, she’ll ask the athlete to squat to a box while pretending the box is smoking hot.

“If you’re thinking about burning your bum on a box, (the athlete) naturally tenses up and tightens up,” Brown said. “Trying to give them a visual that they can experience in a sensory way really helps, even if it’s in their imagination.”

While Brown is speaking specifically about children, the CrossFit Level 2 handbook (referenced above) notes that



While tactile cues aren’t an option when working with children, they often help adults “get out of their heads” and find success.

Emily Beers/CrossFit Journal



Colleen Baz/CrossFit Journal

Kelly Brown cautioned trainers to avoid trying to sound smart when cueing. Simple, direct language will work better, she said.

few adults require detailed anatomical descriptions in cues. Instead, simple but direct language is preferred and will produce the desired results.

Brown has also discovered she needs to be especially creative with children because she doesn't have the option of tactile cueing.

"You never want to put your hands on somebody's kids. We try to do everything visually and verbally because it's safer," she said.

With adults, trainers generally have more options and don't need to limit themselves when cueing if an athlete is OK with tactile cues.

"Corrective strategies should include verbal (i.e., speaking), visual (i.e., showing), and tactile (i.e., touching) cues, all of which may be employed to fix the same fault but may be interpreted differently among athletes. ... The greater the number of strategies a trainer can employ for any fault, the more likely he or she will be successful in correcting the fault," according to the Level 2 handbook.

While Brown spends much of her time coaching children, she said her coaching philosophy is generally the same for adults.

"I just try to make my cues less cutesy with adults," she said.

With both children and adults, Brown said the key is to focus on what you want and avoid getting too detailed and internally focused.

"Giving people the simplest language is best ... because they don't understand the context if you go all technical on them," Brown said.

This hasn't been an easy lesson for Brown to learn. When she first started coaching, she would catch herself giving her clients too many anatomical cues.

"(There's) an innate need to not sound like a dumb personal trainer. I understand human movement and I wanted to tell my clients about it. But the average person doesn't care."

She added: "Stick to telling them what they need to know. Don't get buried in the biomechanics of their mistake."

"Giving people the simplest language is best ... because they don't understand the context if you go all technical on them."

—Kelly Brown

Creative Cueing

Wulf's research gives coaches a template for how to best cue their athletes, but she explained it's only a template. She said she believes it's important for coaches to constantly discover new ways to relate to their athletes personally.

"Use creativity with your words and your mind," Wulf advised.



Emily Beers/CrossFit Journal

Coaches might be tempted to cue this athlete to “use the glutes,” but simply asking him to push the barbell toward the ceiling might be more productive.

She added: “And use images that people can relate to so that it makes them focus on the outcome instead of focusing on body movements.”

Barber, too, said he believes relating to his athletes is one of the most important aspects of cueing. He said one of the biggest mistakes coaches can make is repeating one command they think should always work.

“I see people with vast amounts of knowledge, and they think this cue should work, but then it doesn’t work with 90 percent of people,” Barber said.

Instead, like Wulf, he said he thinks it’s important to focus less on the particular command and more on the intended outcome of the movement.

“I see a huge misconception between cueing and what you actually want from an athlete,” Barber said.

He sees this a lot during Olympic weightlifting.

“Coaches who say, ‘There’s no such thing as a jump in an Olympic lift,’ I think, ‘Fuck off.’ We’re trying to get someone to extend their hips, and if they are cued to jump they’ll extend their hips,” Barber said. “Saying there’s no jump, that confuses the athlete.”

Although technically Barber doesn’t want his athletes jumping half a foot off the ground during a clean, if saying “jump” gets the job done, Barber believes it should be used.

“I’m not afraid of (a cue) not working,” he said. “I’m willing to try new things.”



About the Author

Emily Beers is a CrossFit Journal contributor and coach at *CrossFit Vancouver*. She finished 37th at the 2014 Reebok CrossFit Games.



THE **CrossFit** JOURNAL

SEVEN YEARS' WAR

AFTER FOCUSING ON COMPETITION IN 2008, BEN SMITH WINS THE CROSSFIT GAMES IN 2015.

BY MIKE WARKENTIN



July 26, Ben Smith was crowned the Fittest Man on Earth.

And you might have seen it coming.

Smith, a podium finisher in 2011 and 2013, was far from a long shot heading into the competition, but he also wasn't the odds-on favorite. Many looked to Mathew Fraser, last year's second-place finisher, as the heir apparent to four-time champ Rich Froning Jr.

Fraser won the CrossFit Games Open, dominated the East Regional and looked like a man ready to cast his rivals aside like 10-lb. medicine balls at the Games. Smith finished third in the Open but fourth in the Atlantic Regional, placing 12th or lower in three of seven events—not an ideal way to generate momentum for the tests waiting at the StubHub Center.

But you might have seen Smith coming anyway—especially if you were around in 2009.

Ben Smith's Games Finishes

2009: 64th
2010: 8th
2011: 3rd
2012: 11th
2013: 3rd
2014: 7th
2015: 1st

Building a Champion

“Favorite WOD: All.”

The line is buried way back on the [2009 CrossFit Games website](#). It sits beside a picture of a very young Smith—18 at the time—doing overhead squats or snatches with what looks to be 95 lb. Smith's head is down, his stance is a bit wide, and his knees are rolling in slightly. He's wearing jogging shoes. The image is very different from that of the man who snatched 275 to take second in Snatch Speed Ladder in 2015.

Another tidbit from the profile:

“Least Favorite WOD: N/A.”

If Smith looked slightly raw as a rookie in 2009, he was already showing more polish at the 2010 CrossFit Games.



Nicole Bedard

It was telling that many considered the 2012 Reebok CrossFit Games to be an off year for Smith, who finished 11th. Expectations were rising.



Ruby Wolff

In 2013, Smith was back on the podium at the Games, with eyes on the top step occupied by Rich Froning Jr.

The numbers in the profile are far from pedestrian (see Page 4), as noted in the first comment on the post, from someone called COS: “18 years old? WOW.”

Still, it’s less about the numbers and more about the attitude.

In his profile, 2008 Games second-place finisher Josh Everett listed stats better than Smith’s in almost all cases. He also served up a line most CrossFit athletes will understand:

“Favorite WOD: I don’t look forward to any of them.”

At 18, after starting CrossFit in 2006, Smith had already set himself up for success by deciding he was going to love each and every challenge on the whiteboard.

If his 2009 debut in Aromas, California, was less than glorious, his sophomore year found him in the top 10 when the Games wrapped in their new home in Carson, California. The next year was even better: He stepped on the podium for the first time.

His stats were improving as well. Already in the elite category—especially in 2009, when a five-minute Fran was respectable—Smith’s numbers on benchmark workouts dropped further, while his lifting numbers increased dramatically. For example, his

snatch/clean-and-jerk combo went from 205/270 lb. to 265/320 in 2011 and to 300/365 by 2014.

Coverage of Smith increased as well, as pundits noted “the kid” had all the physical tools at his disposal. Perhaps lost in the now-gaudy numbers was that attitude, unchanged since 2009.

“The main thing I take away from the Games every year is that I need to get better. I always have things to improve. There is not one aspect of fitness that I wouldn’t like to improve. I try to be as well rounded as possible, and that can be achieved through programming,” Smith said in the 2011 article [“The Phenom Arrives: Ben Smith.”](#)

He continued: “Honestly, I don’t see myself being deficient in any one area. I just want to improve in every aspect. If you look at the top competitors, they don’t really have a glaring weakness. They are good across the board, and that’s what makes them great. I need to work to be just a bit better at everything.”

And he did get better at everything, including swimming—something that blindsided many athletes when it showed up at the Games in 2011. With a year of high-school swimming under his belt, Smith finished 16th after Games Director Dave

Castro cut the athletes loose in the waves at Santa Monica Pier. In 2012, Smith was 15th in Pendleton 1—swimming, biking and 150 m of running—and he was fifth in Pendleton 2, which tacked about 11 km of running onto the opening swim-bike pair. Turned out the kid could run, too. In 2013, he was second in The Pool. In 2014, he was 11th on The Beach, and he followed that up in 2015 by taking seventh on Pier Paddle.

“I think I’m in better swim shape now than I ever was,” he said at Hermosa Beach on July 22, still breathing hard but smiling.

While podium finishes highlighted Smith’s growing greatness, something else was happening, something that was moving the young athlete into the ultra-consistent realm of—dare we say it?—Froning. Smith was striking weaknesses off his list, maintaining his supercharged engine, getting ever stronger and, most importantly of all, becoming an all-around athlete who could stay competitive in any event while winning those that were in his wheelhouse.

Find Smith’s name on any CrossFit Games leaderboard and scan horizontally. If you cut Smith a bit of slack for a rough debut in 2009, when his best finish was 33rd and his worst was 62nd, you’ll notice a trend.

In 2010, you’ll see a 35th in Pyramid Double Helen but nothing lower than 15th after that, including an event win and a second-place finish. In 2011, he posted a low of 19th in Killer Cage alongside top-12 finishes in eight of 10 events. He also finished third and 10th in Skills 1 and Skills 2, which included rarer tests such as a softball throw, an L-sit and a weighted chest-to-bar pull-up.

In 2012, Smith had a trio of bad events clustered together. He took 41st in Ball Toss, 28th in Track Triplet and 33rd in Medball-HSPU. In what some might call an off year, Smith balanced the subpar events with six top-10 finishes. In 2013, he logged seven top-seven finishes and three second-place scores. His lowest placing was 32nd on Row 1, a potential bad investment of a scoring opportunity 2,000 m into the marathon. In Row 2—total time for 21,097 m—he was 23rd, perhaps indicating a bit of strategy was in place in the early going. Either way, he was 32 points ahead of Scott Panchik for third when Sunday came to a close.

In 2014, Smith suffered in the Sprint Sled events, but he notched eight finishes in the top 11, including finishes seventh or better in five of the last seven events. On Sunday he delivered what you might call a less-perfect version of a “Froning finish.” While the four-time champ closed out the day with three wins to become

a legend in the Sport of Fitness, Smith put Saturday-night's 24th in the rearview to take 11th, third and seventh to sign off strong.

Every year since 2009, Smith almost put together the performance he needed to win, and early in his career, he realized his potential himself.

"My one goal this year is to win the CrossFit Games," he said in the 2012 article "Dark Horse to Top Dog: Ben Smith." While he didn't come through on top in 2012, he didn't have long to wait. In 2015, he had only one slip: Sandbag 2015, in which he tied for 34th. But that error came very early in the competition, and Smith never finished outside the top 11 afterward. In fact, he was in the top seven in 10 of 13 events, winning two outright and finishing 36 points above Fraser.

After his victory, he told CrossFit Media everything changed in his seventh run at the Games.

"Something felt different. I could feel it," he was quoted in "The Fittest on Earth." And perhaps something was different. After all, he won after six years of trying.

But in reality, nothing was different. Smith just continued to get more and more consistent, and the story rolled on to its logical conclusion. It was all according to a plan set in motion in 2009, when a young athlete from the Mid Atlantic decided to list his favorite workout as "all."

The recipe is actually exceedingly simple, and Smith wasn't in the beer tent when Froning created it: Win the events in your wheelhouse, stay close to the athletes who win events in their wheelhouse, and avoid bottom-barrel scores on your worst events. Refine and improve over a period of years, sprinkle with mental fortitude and just add fitness.

Lots of fitness. ■

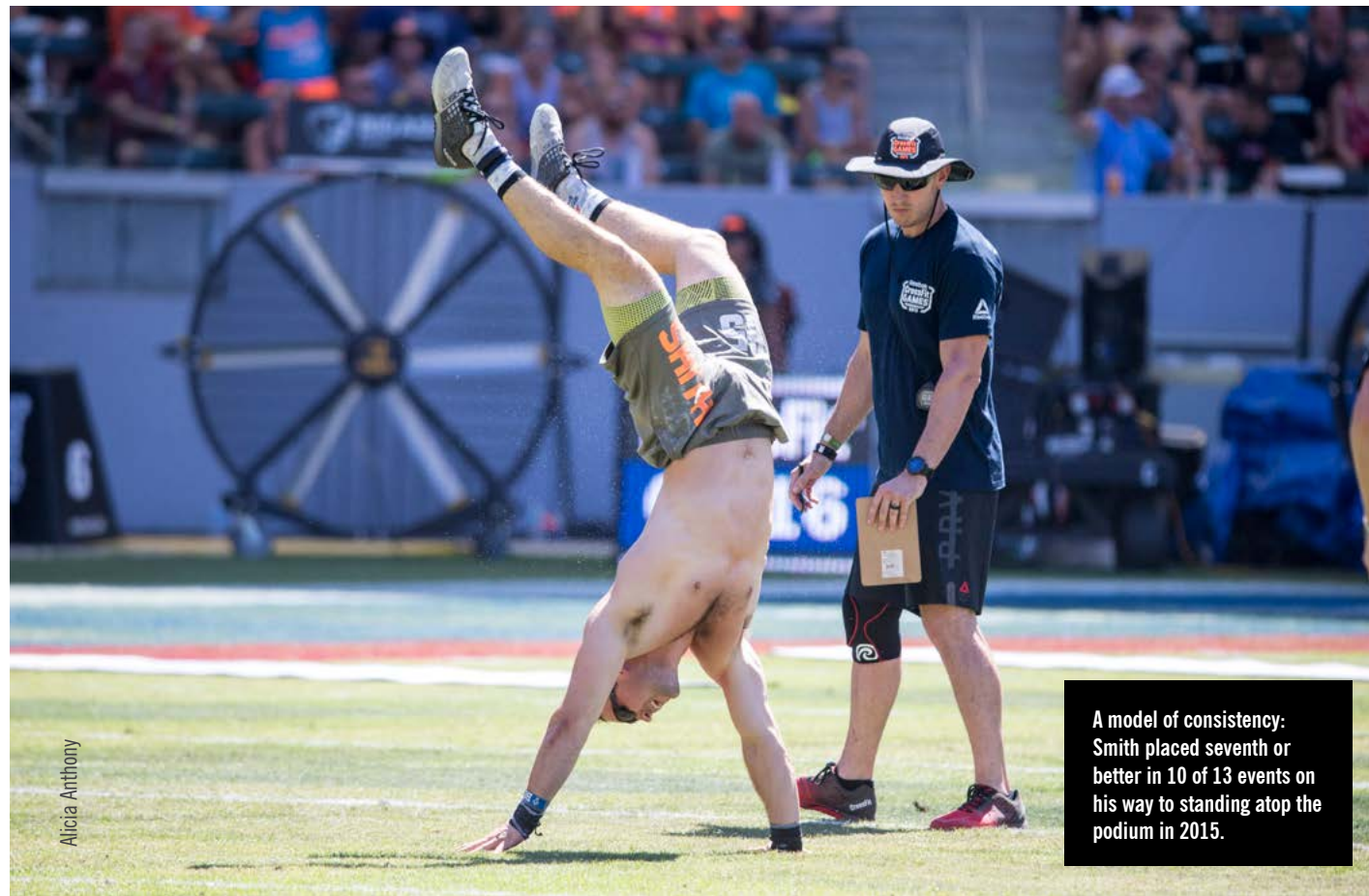
About the Author

Mike Warkentin is the Managing Editor of the CrossFit Journal and the founder of CrossFit 204.



Melissa Smith

Seventh in 2014, Smith was poised to put together the performance he needed to win the CrossFit Games in 2015.



Alicia Anthony

A model of consistency: Smith placed seventh or better in 10 of 13 events on his way to standing atop the podium in 2015.

Ben Smith's Stats Progression

2009—Age 18

Fran: 2:44
Cindy: 30
Helen: 7:36
Grace: 2:04
Deadlift: 455
Press: 155
Back Squat: 405
Snatch: 205
Clean and Jerk: 270
Max Pull-ups: 45
Source: 2009 CrossFit Games Program

2011—Age 21

Fran: 2:25
Helen: 7:19
Grace: 1:51
Deadlift: 540
Back Squat: 450
Snatch: 265
Clean and Jerk: 320
Max Pull-ups: 76
400-m run: 0:58
Fight Gone Bad: 444
Source: 2011 CrossFit Games Program

2015—Age 25

Fran: 2:25
Helen: 7:19
Grace: 1:51
Deadlift: 540
Back Squat: 480*
Snatch: 300
Clean and Jerk: 335**
Max Pull-ups: 76
Fight Gone Bad: 520
Source: CrossFit Games website (accessed Aug. 7, 2015)

*Footage of a 520-lb. lift was uploaded to Instagram late in 2014.
**Footage of a 365-lb. lift was uploaded to YouTube April 15, 2014.

THE CrossFit JOURNAL

Sugar Bombs

Believing sports drinks are a necessary part of athletics, many athletes fail to notice substantial amounts of added sugar can affect their health and performance.

By Emily Beers

August 2015



Dave Re/CrossFit Journal

Many athletes are unaware of the added sugar they consume in sports drinks and other supplements.

Tommy Marinoff used to live off pizza, burgers and Coke.

When he went to the gym, he often guzzled a Gatorade mid-workout.

1 of 6

Sugar ... (continued)

He knew sugar-laced sodas weren't the healthiest options but believed Gatorade was a wise choice, especially for athletic performance and recovery.

"It's so highly advertised for an athlete to drink Gatorade. You see the commercials of athletes drinking them before and during a workout. I was brought up thinking it's what athletes should drink," said 22-year-old Marinoff, who trains at CrossFit North Marin in Novato, California.

Indeed, sports beverages are nothing less than essential athletic fuel, according to advertising.

"We were there for real. Inside the bodies of some of the greatest athletes on Earth," a 2012 Gatorade commercial boasts just as world-record holder Usain Bolt pops a Gatorade product into his mouth.

Marinoff never read the labels on the beverages he consumed. Good nutrition wasn't on his list of priorities two years ago when he was attending Butte College in Chico, California.

"Access to good food (in college) was there, but it was out of the way and harder to get. And nobody was eating it," Marinoff said. "You didn't want to be the one showing up with the chicken salad."

At 5 foot 3 and 112 lb., he wasn't overweight, so he wasn't concerned with consuming too much sugar. It was "always just so easy," he said, to get his hands on sodas and sports drinks. They tasted good, and he believed Gatorade helped athletic performance.

Everything changed in October 2014, when Marinoff started experiencing unusual symptoms: frequent thirst, constant urination, muscle weakness, unexplained weight loss. He ignored the symptoms for a month before he saw a doctor.

Marinoff weighed just 100 lb. when he was diagnosed with Type 1 diabetes, an autoimmune disease that limits or prevents the body's production of insulin. While Type 1 diabetes is considered a genetic disease, Marinoff's doctor told him he believed a simple cold caused his



Courtesy of Thomas Marinoff

After being diagnosed with Type 1 diabetes, Tommy Marinoff put an end to drinking soda and Gatorade.



Emily Beers/CrossFit Journal

These bottles each contain 34 g of refined sugar.

autoimmune response. Researchers are not certain what triggers the onset of Type 1 diabetes in adults, according to Mayoclinic.org.

With Marinoff's body no longer able to produce insulin, he was unable to regulate blood-sugar levels. When he was diagnosed, his blood sugar was measured at 900 milligrams per deciliter of blood (mg/dL). Doctors told him normal blood-sugar levels range between 80 and 120 mg/dL.

Marinoff said he felt lucky to be alive at that moment.

"Nine hundred (mg/dL) is unheard of. The normal couch potato who doesn't work out, there's no way he would be able to live with a blood-sugar (level) that high. You can go into a diabetic coma if you're at 600 (mg/dL)," Marinoff said.

For the first time in his life, Marinoff knew it was time to start learning about the sugar he was consuming on a daily basis. One of the first things he learned was he'd have to give up sodas and sports drinks if he wanted to take control of his health.

Sugar Truths

A 20-oz. bottle of Gatorade's G-Series—the original Gatorade drink—contains 34 g of sugar (136 calories), while a 24-oz. bottle of Ion4 Powerade contains 40 g of sugar (154 calories) in the form of high-fructose corn syrup. This is equivalent to 10 tsp. of sugar. The lower-calorie G2 Gatorade has considerably less sugar—12 g in a 20-oz. bottle—but also contains sucralose, an artificial sweetener.

Although 20 oz. of Gatorade has less sugar than the same amount of Coca-Cola (64 g) and Mountain Dew (77 g), Caryn Zinn, a dietician from Auckland, New Zealand, explained Gatorade's sugar content is still problematic.

"The bottom line is that it is still refined sugar and needs to be minimized in our diet for optimal health," said Zinn, who has a doctorate in public health nutrition from Auckland University of Technology.

The [American Heart Association](http://AmericanHeartAssociation.org) recommends people limit added-sugar intake to no more than 100 calories (26 g) a day for women and 150 calories (38 g) a day for men. This means consuming one 20-oz. bottle of Gatorade during a workout exceeds the amount of added sugar most people should consume in one day. Zinn said even 100 calories of added sugar—such as the high-fructose corn syrup found in many sports drinks—a day is usually too much.

Excess sugar in our diets today is contributing to what has become nothing short of a sugar epidemic.

"I think that it's a matter of the lower, the better," she said about added sugars.

In "Clinical Report—Sports Drinks and Energy Drinks for Children and Adolescents: Are They Appropriate?" the American Academy of Pediatrics warns about the potential health dangers caused by consuming sugary sports and energy drinks.

"Frequent or excessive intake of caloric sports drinks can substantially increase the risk for overweight or obesity in children and adolescents," the report stated.

Excess sugar in our diets today is contributing to what has become nothing short of a sugar epidemic, Zinn said.

"I'd say it's colossal."

The 2012 article "[The Toxic Truth About Sugar](#)," published in the international weekly science journal *Nature*, echoed Zinn's views. Global sugar consumption has tripled in the last 50 years, according to the article.

"Evolutionarily, sugar as fruit was available to our ancestors for only a few months a year (at harvest time), or as honey, which was guarded by bees. But in recent years, sugar has been added to virtually every processed food, limiting consumer choice. Nature made sugar hard to get; man made it easy," wrote authors Robert H. Lustig, Laura A. Schmidt and Claire D. Brindis.

Sports drinks are only making the sugar crisis worse, Zinn said.

"Drinks contribute a lot to this."

The Electrolyte Myth

Paris Vannata is the owner of CrossFit Bradenton in Florida. Like Marinoff, Vannata discovered he was a Type 1 diabetic as an adult and has become more conscious of his diet since being diagnosed.

As a CrossFit trainer, Vannata encounters clients like Marinoff all the time—clients who believe sports drinks will help them replace electrolytes, avoid dehydration and improve performance.

"For years, we've been told Gatorade is a sports drink, and we don't look at the label. (So people believe) it's good for recovery, it will help performance, we need the electrolytes," Vannata said.



Courtesy of Paris Vannata

CrossFit Bradenton owner Paris Vannata dissuades clients from consuming sports drinks because of the refined-sugar content.

For years, Gatorade's ad campaigns have touted the beverage's ability to improve performance and recovery. The sports-drink maker also claims it **hydrates more effectively than water** and that it helps with dangerous **electrolyte loss**.

Gatorade's marketing and advertisements are problematic, Zinn explained.

Most athletes don't need to worry about replacing carbohydrates or electrolytes as they exercise, she said, and most athletes are better off hydrating with water because Gatorade causes an insulin spike.

"By creating cool sports-drink colors, flavors and advertisements that use cool, high-profile athletes—whether or not they actually use the product—this just makes people want to buy the product more in the often-erroneous belief that they need it," Zinn said. "(It's) not good for sales if the real message comes through."



Courtesy of Caryn Zinn

Caryn Zinn, who holds a doctorate in public health nutrition, says society is in the midst of a sugar epidemic.

Much of the time, the marketing is directed at children.

"Sports drinks are seen by children as being cool and a good high-energy drink to consume. Much of the time it is an unnecessary source of refined sugar that does more harm than good," she said. "These companies always claim that they market their products to athletes. ... Kids and adults not in the know think that it is necessary for everyone doing exercise to drink it."

"I now realize that you cannot trust research that is funded by the very company who wants to make money by selling their product."

—Caryn Zinn

One reason Vannata thinks Gatorade has been successful is because it has convinced the public its claims are based on science. The **Gatorade Sport Science Institute's website** features scientific publications that often talk about the supposed health benefits of consuming Gatorade products.

For example, a 2014 GSSI publication titled "**Optimal Composition of Fluid-Replacement Beverages**" suggested fluid-replacement beverages can "augment physiological functions."

Many times, the GSSI sponsors and funds research for organizations the public considers credible, such as the American College of Sports Medicine (ACSM). The ACSM lists the GSSI as an **official corporate partner**.

Zinn suspects the GSSI could have an agenda beyond its **website's stated mission** to help athletes "optimize their health and performance through research and education in hydration and nutrition science."

She said: "I now realize that you cannot trust research that is funded by the very company who wants to make money by selling their product."



Dave Re/CrossFit Journal

Sports drinks such as Gatorade contain a notable dose of processed sugar.

For his part, when Vannata encounters a client who's influenced by the GSSI's performance claims or ads featuring stars, he encourages him or her to consider the sugar.

"I also use myself as an example of someone who only drinks water and (has been) without any issues for years."

And if a client is fearful of electrolyte loss, Vannata explains to the client this is mostly a concern when exercising continuously for more than two hours.

"If they really feel like they need to replace electrolytes, coconut water is a better choice," Vannata said.

He added: "I find that the trade-off of possible benefits versus the negatives of drinking sports drinks just isn't worth it."

Sugar Regulation

Months have passed since Marinoff was diagnosed with Type 1 diabetes. He said his life is better today because he's conscientious of the food and drinks he consumes.

He works with a nutritionist and endocrinologist who teach him about insulin and sugar levels and encourage him to focus on clean eating. Marinoff no longer guzzles sodas or sports drinks. The small amount of sugar in his diet today comes from fruits and vegetables.

"I can tell my energy is pretty much the same all day. It's not up and down all day like when I drank Coke and soda all day. It's noticeably different," Marinoff said. "Before all this, I just kind of ate whatever."

Had Marinoff not been diagnosed with Type 1 diabetes and forced to learn about sugar, he wouldn't have had a reason to stop pumping his body full of Coke and Gatorade.

This is why he supports [new legislation in San Francisco](#) that requires warning labels on ads for sugary beverages.

The legislation will go into effect this summer and means advertisements for drinks such as Coke and Gatorade will be required to state, "Warning: Drinking beverages with added sugar(s) contributes to obesity, diabetes and tooth decay. This is a message from the City and County of San Francisco."

Marinoff, who lives just 30 miles from San Francisco, said he hopes the law will help educate people—especially adolescents—about the sugar they consume every day.

"I think it's a great learning process for the younger generation."



About the Author

Emily Beers is a CrossFit Journal contributor and coach at [CrossFit Vancouver](#). She finished 37th at the 2014 Reebok CrossFit Games.

THE
CrossFit JOURNAL

BIG SODA FIRES BACK

BY ANDRÉA MARIA CECIL

American Beverage Association sues San Francisco over health-warning language on ads for sugar-sweetened beverages.





It's not the occasional 8-oz. soda that's worrisome. It's the fact that most people who drink soda guzzle much more than just one, noted Marion Nestle, professor of nutrition, food studies and public health at New York University.

On a typical day, 80 percent of children and adolescents and 63 percent of adults consumed sugar-sweetened beverages in 2010, according to the [U.S. Centers for Disease Control and Prevention](#). In 2012, 17.1 percent of adults drank soda at least once per day across 18 states, according to the agency's ["Morbidity and Mortality Weekly Report"](#) published Aug. 15, 2014.

Soft drinks contributed more energy to the American diet than any other single type of food or beverage, according to a 2010 University of California, Berkeley, study titled ["To What Extent Have Sweetened Beverages Contributed to the Obesity Epidemic?"](#) They also were the top source of liquid energy in the U.S. diet, the study stated. And soda, specifically, accounted for more than 60 percent of the calories Americans consumed as sweetened beverages, according to the report.

"Some studies find that even one 12-ounce soda a day is associated with an increased risk for type-2 diabetes," Nestle, author of the forthcoming book *"Soda Politics: Taking on Big Soda (and Winning)"*, told the CrossFit Journal. She has no relation to the food company with the same name.

Dr. Barry Sears, creator of the Zone Diet, explained it plainly.

"No one's going to drink a half a can of Coke the same way you're not going to eat a half banana," he said. "Once you peel the banana, you're gonna eat it."

This is part of what motivated the City of San Francisco to pass two ordinances—both enacted last month—one of which requires a warning on advertisements for sugar-sweetened beverages:

"WARNING: Drinking beverages with added sugar(s) contributes to obesity, diabetes, and tooth decay. This is a message from the City and County of San Francisco."

The [American Beverage Association \(ABA\)](#) didn't take kindly to that.

Science has linked consumption of sugar to health problems, but the ABA hopes to avoid tobacco-style health-warning language on beverage advertising.



Scott Wiener, a member of the San Francisco Board of Supervisors, said he wasn't surprised by the ABA lawsuit.

On July 24 the ABA—the trade group that represents the country's nonalcoholic beverage industry—filed a lawsuit against the City and County of San Francisco, claiming the municipality's two ordinances violate the First and 14th Amendments. The suit was filed in the United States District Court, Northern District of California. Joining the civil action are the California Retailers Association and the California State Outdoor Advertising Association. The First Amendment to the U.S. Constitution guarantees multiple freedoms, including speech, while the 14th Amendment speaks to “equal protection of the laws.”

The first ordinance—an **amendment to the city's existing administrative code**—prohibits advertising of sugar-sweetened beverages on municipal property. The code already bans advertising of tobacco products and alcoholic beverages on city property. It also bars the name of any company producing, selling or distributing any of those products from “any promotion of any event or promotion of any product or beverage” on city-owned or controlled property.

The second—an **amendment to the city's health code**—requires ads for sugar-sweetened beverages to include the warning. The amendment also authorizes the Director of Health to impose penalties for those who don't comply.

San Francisco's Board of Supervisors passed both amendments on June 16. They were enacted in July.

Together, the ordinances “seek to replace the free marketplace of ideas with a single government-imposed viewpoint. Private speakers who disagree with this viewpoint must stop speaking, parrot the government's opinions, or pay a fine,” according to the ABA's suit.

“The City apparently mistrusts the people's competence to hear competing views about sugar-sweetened beverages and decide for themselves whether or how to consume them.”

Both ordinances should be “struck down,” the suit states. The plaintiffs also want injunctive relief to halt the city from enforcing or threatening to enforce any part of the ordinances against the plaintiffs and any of the plaintiffs' members.

The ABA is based in Washington, D.C., and its members include **The Coca-Cola Company** and **PepsiCo**.

“Our opposition to these ordinances is to preserve our rights to do business on a level and constitutional playing field. Our industry remains committed to providing clear, transparent information to help people make informed decisions about what beverages are

best for them and for their families,” reads a previously released written statement the ABA provided to the Journal through an outside spokeswoman.

Latham & Watkins, also based in Washington, D.C., is representing the ABA and declined to comment further through spokeswoman Jamie Elise Zuieback.

The ABA's suit came as little surprise to San Francisco, said **Scott Wiener**, a member of the city's **Board of Supervisors** and author of the health-warning language.

“We expected the soda industry to file suit against the health warning legislation. This legislation is groundbreaking—the first time any government has required health warnings in connection with sugary drinks. The soda industry has unlimited resources and has proven over and over again that it will do and spend whatever it takes to prevent communities from taking bold action to protect residents from the health consequences of consuming sugary drinks,” he wrote in an email.

Harold Goldstein, director of the California Center for Public Health Advocacy, also said he expected the ABA to challenge the ordinances.

“The last thing the beverage industry wants is the equivalent of skull and crossbones on all their ads or all their bottles,” said Goldstein, who holds a doctorate in public health.

The Davis-based organization has been going toe to toe with both Big Soda and Big Food since its inception in 1999.

“I'm interested in solving the obesity-and-diabetes epidemic,” Goldstein said.

The most effective and efficient step to lower the diabetes rate among Americans is to “dramatically reduce the drinking of sugar,” he added.

Both Goldstein and Wiener expressed confidence in San Francisco's being able to successfully defend against the ABA suit.

Government requires health warnings on cigarettes and alcohol ads, both men noted.

“And those warnings are legal,” Wiener said. “So are these warnings for soda ads.” ■

About the Author

Andréa Maria Cecil is assistant managing editor and head writer of the CrossFit Journal.



Harold Goldstein, director of the California Center for Public Health Advocacy, said drinking less sugar is a very effective way to reduce the incidence of diabetes.

THE **CrossFit** JOURNAL

A STICKY STORY

FOR ALMOST 50 YEARS, GATORADE'S MARKETING MACHINE HAS BEEN WORKING TO MAKE YOU THIRSTY.

BY CHRIS COOPER



You can lead a man to water, but you can't make him drink. Add sugar, salt, artificial flavors and a good story, and he'll drink himself to death.

Since the early 1960s, sports-drink companies have worked to sell as many beverages as possible, and now the toughest market segment—people who just aren't thirsty—has become the target thanks to clever advertising and sponsored research.

Gatorade created the “sports beverage” category and continues to dominate even though its marketing claims contradict scientific evidence, as shown in a document from the [California Center for Public Health Advocacy](#). From its conception in 1965, the drink hasn't altered its formula, drawing questions from the likes of Darren Rovell in his book “First in Thirst: How Gatorade Turned the Science of Sweat Into a Cultural Phenomenon”:

“This lack of change (in the Gatorade formulation) has caused some people to be skeptical as to the true function of the Gatorade Sports Science Institute (GSSI), which has funded more than 120 studies in the past 17 years. Is GSSI there to develop the latest and greatest sports drink formula for the masses, or is it there to use science to best defend the status quo?”

Gatorade's benefits have been hyped by owners of the formula, beginning with Stokely-Van Camp Inc.'s assertion that Gatorade was absorbed by the body “twelve times faster than water,” which was later discredited by its next owner, Quaker Oats. Quaker, already adept at using “research” as a marketing tool, founded the Gatorade Sports Science Institute (GSSI) in 1988. A year later, Gatorade sponsored the American College of Sports Medicine (ACSM), which in 1996 produced research supporting [maximal intake](#) of fluid—especially palatable fluids containing carbohydrates—even before an exerciser became thirsty.

And despite a growing mound of scientific evidence that confirms drinking before thirst is unnecessary and even dangerous, sports-drink sales could reach US\$9.3 billion in 2017, according to [Fooddive.com](#).

Gatorade's marketing aside, experts are aware that hydration is actually very simple.



Created in 1965, Gatorade is the biggest name in the multi-billion-dollar sports-drink industry.

istockphoto.com/ovleah

“We have a 300 million year developed system that tells you with exquisite accuracy how much you need to drink and when you need to drink. It’s called thirst,” hydration expert Dr. Timothy Noakes wrote in “Waterlogged: The Serious Problem of Overhydration in Endurance Sports.”

Noakes is right, but sports-drink companies have somehow convinced us to drink when we’re not thirsty and to drink to stave off cramps—another practice unsupported by science (see “Brain Cramps?”).

The campaign of misinformation might boost sales and funnel dollars to shareholders, but it can have horrible consequences. The family of **Zyrees Oliver** will find no consolation in Gatorade’s profits. The young athlete died of hyponatremia—drinking too much fluid, including Gatorade.

A Sticky Story With a Sweet Finish

The story of Gatorade is spun around old-fashioned ingenuity, hard work and football. College gridiron stars such as Steve Spurrier united with the likes of basketball great Michael Jordan to elevate the tale to legend, and the zero-budget lab experiment now enjoys over \$3 billion in annual sales, according to [Forbes.com](#).

When Michael Phelps won eight medals at the Athens Olympics, he bought his mom, Debbie, a new Mercedes “for all the Gatorade you bought me.” Elvis chugged Gatorade onstage during his comeback tour in the 1970s. Two of the most popular bulls on the Professional Bull Riders circuit—Little Yellow Jacket and Slim Shady—drink Gatorade before every event. It’s publicity no brand can buy, but Gatorade can repeat the stories over and over.

Legends, however, have a tendency to become exaggerated over time, and the Gatorade story is no different.

Dr. Robert Cade of the University of Florida is credited as Gatorade’s inventor, according to “First in Thirst.”

In the summer of 1965, Florida Gators players drank very little during stifling summer practices, Cade explained in a [1996 interview with Samuel Proctor](#). Players were routinely admitted to the hospital for heat stroke, and Gators assistant coach Dwayne Douglas asked Cade why his players didn’t “wee” after the game. Cade’s theory was the players were dehydrated.

Cade studied the sweat of 10 players on the Gators freshman team and continued his experiments with football players,

basketball players and swimmers. Most weren’t drinking at all during practice or competition because their coaches feared ill effects if the players drank too much water.

“I’m not sure why,” Cade said in the interview. “But all kinds of dire things were predicted if they drank water during the (game).”

In each case tested by Cade, allowing the thirsty athlete to drink improved performance. Cade’s research seemed to support the hypothesis that ingestion of fluid during exercise was better than avoiding it.

On Oct. 2, 1965, Cade tested his as-yet-unnamed concoction on the freshman Gators in the annual “Toilet Bowl” in which the freshmen played the varsity B team. Cade predicted the freshmen would have more energy in the fourth quarter, and he was right: The rookies mounted a comeback victory. Cade was asked to mix a batch for the varsity team’s game against Louisiana State University the next day. Without a budget for development, Cade had to “borrow” glucose from other research labs at the university after they were locked up for the weekend.

In the first quarter of the LSU game, Cade handed a cup to Larry Gagner, a guard who had just come off the field.

“This stuff tastes like piss,” Gagner said, dumping it over his head instead.

According to a [transcript of the Proctor interview](#), Cade said he told the player next to Gagner, James Benson, “Not only would he keep his energy during the game, but if he kept drinking it throughout the game, at the end he would feel better and be stronger.”

Other teammates drank it and reported liking the taste. Near the end of the first half, Gagner changed his mind: “He said, ‘Doc, I have decided I like the taste of piss,’” Cade recalled in the interview.

The Gators gained about 250 yards in the second half, and Florida coach Ray Graves requested the drink for the rest of the season, Cade said in the interview.

The “Gatorade” name came a month later. Cade’s staff considered the suffix “aid” instead of “ade” but worried about the Food and Drug Administration’s requirement for clinical testing and stuck with the latter, which sounded less therapeutic.

The Gatorade brand got its first boost from the Florida Gators’ success in 1965. Spurrier was quarterback, and the team rallied for several come-from-behind victories against tough opponents.



Dr. Robert Cade serves his concoction to football players. Stokely-Van Camp acquired the rights to Gatorade in 1967 and began marketing the product aggressively.

“I don’t know how much of that was Steve Spurrier’s ability to beat them in the fourth quarter and how much was Gatorade, but we thought it was Gatorade. And I guess that was half the war,” said Chip Hinton in “30 for 30 Shorts: The Sweat Solution” on ESPN. Hinton was a linebacker for the Gators from 1965-68.

“I don’t have any answer for whether the Gatorade helped us be a better second-half team or not. ... We drank it, but whether it helped us in the second half, who knows?” said Spurrier, according to Rovell’s book.

After the team’s final game against the University of Miami, Neal Amdur, a reporter for The Miami Herald, walked onto the field to interview Graves. Seeing milk cartons scattered around, Amdur asked Graves if the players were drinking milk during the game. Graves instead extolled the virtues of Gatorade, and Amdur’s resulting story was picked up by The Associated Press and United Press the next day.

“We started getting calls from all over the country,” Cade said in the [Proctor interview](#). He began loading orders onto Greyhound buses but was poor at collecting payment and couldn’t afford to make

more of the product. When he approached University of Florida staff about funding the development of Gatorade, he was rebuffed, so he took a personal loan and began selling a concentrated version. In the ’70s, the University of Florida changed its tune, and litigation resulted in a [20 percent share](#) of Gatorade royalties for the university.

Cade, of course, was a scientist, not a marketer. When he was approached by Stokely-Van Camp in 1967, he quickly sold the rights to his formula. Also in 1967, Gatorade linked up with the NFL, greasing the rails for partnerships with other major leagues. By the late ’80s, teams had taken to dumping Gatorade on winning coaches, and the tradition lives on today. Momentum increased with the wildly successful 1991 “Be Like Mike” ad campaign with Michael Jordan.

Today, Gatorade is linked to hosts of colleges, pro leagues and top athletes, and though it’s challenged by Powerade and other beverages, it still enjoys a 46 percent market share, [according to Forbes](#). If Gatorade’s inventor was poor at marketing, its subsequent owners wrote the book on celebrity endorsements and product placement.



By 1967, Gatorade had partnered with the NFL and was well on its way to becoming deeply ingrained in sports and fitness.



While experts maintain athletes should only drink when thirsty, the practice of “prehydration”—drinking ahead of thirst—is common in sports.

Gatorade and Sports Science

When Quaker Oats acquired Stokely-Van Camp in 1983 for \$220 million, Quaker executive Phil Marineau was skeptical about Stokely’s claims that Gatorade was absorbed by the body 12 times faster than water. He ordered testing in Quaker labs. Marineau’s scientists reported their new product was absorbed at the same rate as water, not faster, according to “First in Thirst.” Quaker’s strategy shifted to emphasize the carbohydrate content of Gatorade and the energy it could provide to athletes, supposedly making it superior to water.

“When I heard that, I knew we had the ammunition to win,” Marineau is quoted as saying in “First in Thirst.” “It sounds small, but if it weren’t for the test results that said what it did, we wouldn’t be here.”

Quaker began funding studies to prove Gatorade’s value in 1985. Three years later, the company opened the Gatorade Sports Science Institute in Barrington, Illinois. Marineau soon joined the board of the ACSM.

This was not a new strategy for Quaker. Its research laboratories—now known as the Quaker Oats Center of Excellence, also located

in Illinois—produced decades of research (“Fiber Stalls High Blood Pressure,” for example) supporting the health benefits of a grain-based diet.

In 1989, when Cade created a new drink dubbed TQ II for thirst quencher—second generation (sometimes referred to as “TQ2”), he pitched the idea to Quaker first.

“We pitched it in the lab,” Cade told Proctor, “and it was significantly better than Gatorade on someone working very hard or exercising very hard.”

Quaker had no interest in the product until Cade connected with Pepsi, at which point Quaker sued Cade. After several years of litigation, Cade sold TQ II to Quaker, who promptly shelved it.

“They paid us \$2,000,000 for the rights to it. They did not want to make it because they are afraid of the New Coke syndrome,” Cade told Proctor.

The GSSI then produced research that countered Cade’s claims the beverage was superior.

GSSI Director Bob Murray “says that TQ2 might have been touted as a better Gatorade, but GSSI, as well as outside research, concluded that Cade’s key ingredients of glycerol and pyruvate didn’t enhance the performance of a sports drink,” Rovell wrote.

Also in 1989, Gatorade established a sponsoring partnership with the ACSM. A little over a year earlier, the ACSM had released a position stand on hydration, recommending “fluid replacement stations every mile” on marathon courses. Gatorade has been the highest-level sponsor of the ACSM since 1991, according to Rovell’s book.

In 1992, Gatorade donated \$250,000 to the ACSM; in 1993, Gatorade sponsored an ACSM roundtable meeting on exercise and fluid replacement. The results from the roundtable were published in 1996; guidelines advised athletes should “drink as much as is tolerable.”

Between 1999 and 2006, Gatorade’s Field Testing Program took place on college campuses “to understand the implications of fluid and electrolyte losses on thermoregulation, performance and muscle cramping,” according to GSSIweb.org.

In 2000, Larry Armstrong said, “I believe the vast majority of people do not exceed 50 minutes (of exercise), so I would think the vast majority of people who use Gatorade don’t need it.”

Armstrong, a professor in the Department of Kinesiology at the University of Connecticut, holds a doctorate in human bioenergetics and is currently president of the ACSM’s Board of Trustees. The University of Connecticut lists exercise and heat, sports drinks and fluid-electrolyte balance as some of Armstrong’s areas of expertise.

In the same Wall Street Journal interview, Armstrong hesitated to say more for fear of offending other researchers.

“I have too many friends that deal with them,” he says. “It’s not necessarily a bad thing, but it does affect objectivity.”

Fifteen years later, Armstrong actually **reversed his stance** in the same publication: “At the point that you sense thirst, your physical performance and cognitive function are beginning to decline.”

Then he suggested athletes should craft their own hydration plans based on their rate of sweat lost per hour.

The [2007 ACSM Position Stand: Exercise and Fluid Replacment](#) was written by Gatorade-sponsored scientists. Perhaps unsurprisingly, it recommended “prehydration” and noted, “Consumption of beverages containing electrolytes and carbohydrates can help sustain fluidelectrolyte balance and exercise performance.”

While the position stand noted the dangers of overdrinking in its conclusion, recommendations to prehydrate certainly stand against those of Noakes and other experts who suggest athletes should only drink when they are thirsty.

The [BMJ](#) highlighted multiple author and reviewer conflicts of interest—including many links to Gatorade and the GSSI—in the disclosures section:

“Three of the six authors of the updated guidance declared major financial conflicts of interest. Randy Eichner and Nina Stachenfeld had financial ties to Gatorade, and Ronald Maughan had received funding from Coca-Cola and GSK, as well as being on the GSSI review board. Louise Burke had no personal financial ties, although her institution, the AIS, received funding from Gatorade. The other two authors, Michael Sawka (chair of the committee) and Scott Montain, worked for the U.S. military and had attended the exclusive Quaker Oats meetings in the 1990s. Even two of the five reviewers—Michael Bergeron and Mark Hargreaves—declared financial links to Gatorade.”

When The BMJ questioned the ACSM on its selection of authors, a college spokesperson pointed to “best practices regarding corporate relationships.”

With an increasingly powerful beverage maker funding research into hydration, it’s not surprising a more-is-better attitude appeared.

While experts in the Noakes camp agree that athletes should follow their thirst when hydrating, [“ACSM’S Resources for the Personal Trainer”](#) (2012) contains the following on page 172:

“A key to athletic success is avoidance of a state of underhydration. This is not as easy as it may seem, because many people rely on ‘thirst’ as the alarm bell for when to drink. Thirst, however, is a delayed sensation that does not occur until the person has already lost 1 to 2 liters of fluid. Because of this, people should learn to consume fluids on a fixed time interval rather than relying on thirst for when to drink. Staying optimally hydrated and fueled during exercise has multiple benefits.”



The contents of this cooler might be dumped on the winning coach in a ritual that highlights Gatorade's saturation of sports.



While Gatorade's marketing presents the product as fuel for performance, research has not proven sports drinks are essential for athletic success.

The same publication shows pictures of athletes using sports drinks (figures 6.10, 6.11, 6.12) and lists Gatorade products by name in a table (6.16).

While Gatorade hasn't changed its formula, perhaps it's starting to change its tune, even if the new information hasn't overwhelmed years of marketing.

In the April 2015 webinar "[SSE #141 Hydration for Football Athletes](#)," Gatorade-sponsored scientists William M. Adams and Douglas J. Casa highlighted the need for individualized hydration prescriptions. In Table 3, the authors recommended, "If sweat rate is unknown, you should drink to the sensation of thirst to minimize the risk of over drinking."

This was Gatorade's first acknowledgement of the risks of hyponatremia.

Perhaps serendipitously, Gatorade is working on products purported to address the individual needs of elite athletes as blanket guidelines fall by the wayside. In 2014, Gatorade provided a "[unique personalized hydration system](#)" to individual players on the Brazilian World Cup team. A sensor planted in each player's water bottle sent hydration information to team coaches and trainers, who then followed recommendations on a tablet app (provided by Gatorade.) A [promotional video produced by Gatorade](#) blurs the lines between research and advertisement: Every scientist, athlete and spokesperson in the video is sponsored by Gatorade.

Earlier this year, Gatorade's owner, PepsiCo, was advertising for a "[Senior Scientist](#)" on its website. Duties included the "development/implementation of educational strategies for the GSSI program at IMG Academy with an emphasis on sports nutrition personalization" and "lead GSSI IMGA field-based testing for the purpose of prototype and/or technology validation."

Mixology and Marketing

"Athletes are artists," [Phoebe Cade Miles](#) recalled her father as saying.

But perhaps the real art is the combination of science and marketing. Sponsored science, advertisements and carefully

planted messages on social networks come together in Gatorade's "[Mission Control](#)," which monitors conversations about the brand and inserts its influence when necessary.

It's all part of a marketing machine that's been running since the '60s.

Even if competition has reduced Gatorade's market share to 46 percent worldwide (69.5 percent in the U.S.), the company has succeeded in working its way into just about every facet of professional and college sports and even leveraging stars who endorse competitors. NBA sponsorship dictates NBA superstar LeBron James—who endorses Powerade—drink Gatorade during games, though he removes the logo from the bottle, according to [Deadspin.com](#).

While shoe-in hall-of-fame superstars hold the bottles, it's the GSSI that holds the reins and produces the research that tells athletes—elite and otherwise—they need the product. Ads quoting studies and scientists in lab coats tell athletes they'll perform better if they pay more attention to fluid and electrolyte levels, and who wouldn't want to perform better? It's science, you see.

And even if the validity of the research is questioned—and The BMJ most certainly did that by highlighting the poor design and questionable results of a host of studies on hydration—the critics' voices aren't loud enough when the crowd screams as the winning coach is drowned in a shower of Gatorade. ■

About the Author

Chris Cooper owns [CrossFit Catalyst](#) in Sault Ste. Marie, Ontario.

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VIRTUOSITY

Virtuosity 10: For Life

Once “allergic” to exercise, Annie Kolatsis finds greatness through a CrossFit affiliate.

By Annie Kolatsis

August 2015



Annie Kolatsis

The crew at CrossFit Mother City in Cape Town, South Africa.

I'll never forget how much it hurt.

Rolling out of bed the morning after my first CrossFit class—I literally had to roll to achieve the momentum needed to get up—I thought to myself, “What have I done?” The funny thing is I knew exactly what I had done. I still remember it more than a year later: 5 pull-ups, 10 push-ups, 15 squats. Simple enough, right? That was the day I learned to never underestimate a WOD.

1 of 2

As someone who came from a rather inactive family and had an acclaimed “allergy” to exercise, I shocked myself and most of the people who know me when I signed a year-long contract at CrossFit Mother City. A year: the longest I’ve committed to anything that wasn’t education.

I don’t know what it was that snapped, but I found myself at a place where treating my health and my body with arrogant indifference just didn’t cut it anymore. People around me were doing great things—running marathons, hiking mountains. When I realized the only “great” in my vocabulary was spelled G-R-A-T-E, I knew it was time for a revolution. It came in the form of CrossFit Mother City.

Walking into the box was like walking into a foreign country. The people spoke a different language, with words such as “AMRAP” and “EMOM” being thrown around amidst swear words directed at some woman called Fran. But I learned. Soon, the language became second nature and the words spilled out of my mouth as I earned my CrossFit citizenship. Reebok sneakers were soon to follow.

As my training wore on, I came face-to-face with my biggest obstacle: myself. Truth be told, I often find CrossFit harder on my mind than on my body. I can deal with the stiff muscles and power through the aches and pains, but there’s no warm-up or stretch to ready your mind for what lies ahead.

Describing my first few months as tough would be an understatement. There wasn’t a day when I didn’t want to faint, vomit or cry during a workout—sometimes all at once. I remember the looks of horror I got when I described the situation to my friends. I was always met with the same question: “Why are you still doing it?”

The answer was simple: Because it has changed me.

My arrogant indifference has been replaced by fierce loyalty toward my body and my box. Instead of “you can’t do this,” the voice in my head repeats words of encouragement from my coaches. My new friends—relationships forged quite literally out of blood, sweat and tears—inspire me to go on.

I am finally doing great things, and while I’m not yet running marathons, I have climbed many mountains both physically and mentally.

CrossFit Mother City has changed me. It’s where I go to achieve greatness, and when I sign my new contract, there’s only one membership option I’m interested in: life.



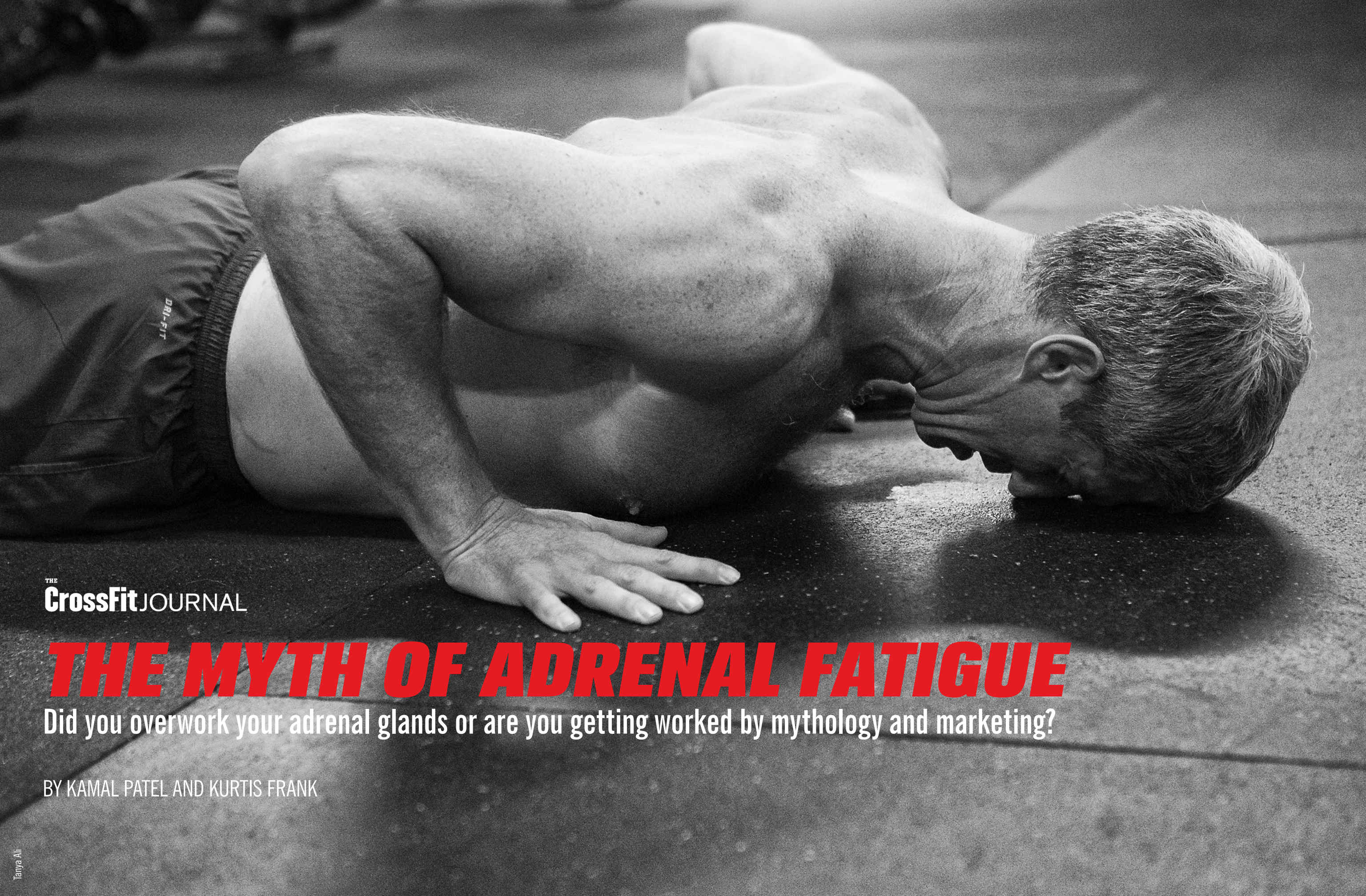
Submission Guidelines

To be considered for publication, authors must satisfy the following:

1. Articles must be original, unpublished works. Authors of selected submissions will be supplied with legal documents to be filled out prior to publication.
2. Articles must be submitted in Word documents attached to an email. Documents should not contain bolding, italics or other formatting. Please submit in Arial font.
3. Articles can be 500 words maximum.
4. Each article must be accompanied by at least one high-resolution photograph to illustrate the story. The photo can feature the coach, the affiliate, the community—anything that illustrates the article. Photo guidelines are as follows:

- A. Photos must be original and owned by the person submitting. Photos taken by others may be submitted provided the owner has given permission.
- B. Photos must be in focus, well lit and free of watermarks. Minimum file size is 1 MB. Please review your camera’s settings to ensure you are shooting high-resolution images. Cell-phone photos and thumbnails are not accepted.
- C. Photos must be attached to the email as JPEG files. Do not embed files in Word documents. Photo file names should list both the name of the subject and the name of the photographer in this format: SubjectName-PhotographerName.jpg. Examples: JohnSmith-JaneDoe.jpg or CrossFitAnyTown-JimJohnson.jpg.

Virtuosity@crossfit.com is open for submissions. Tell us why you train where you train, and do it uncommonly well.



THE
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THE MYTH OF ADRENAL FATIGUE

Did you overwork your adrenal glands or are you getting worked by mythology and marketing?

BY KAMAL PATEL AND KURTIS FRANK



Jacob Siegel

It's likely adrenal fatigue is actually just general fatigue and can be alleviated by adjusting lifestyle.

Sticking to a physical exercise routine is tiring, but the soreness and fatigue from a good workout can easily be alleviated with a full meal and plenty of rest, so you're raring to go by the time your next workout rolls around.

That's the theory, at least.

When real life gets in the way, recovery can suffer. Sometimes fatigue persists for so long between workouts that it doesn't even seem to be caused by the gym.

If you've ever visited a supplement store in an effort to alleviate the symptoms of fatigue, you might have been told you're suffering from adrenal fatigue. This is a common error. In short, adrenal fatigue doesn't actually exist.

"Adrenal fatigue" is a marketing buzz term designed to sell products. Though the supposed symptoms of adrenal fatigue—including brain fog, difficulty paying attention and lethargy—are real, adrenal fatigue itself is not a condition recognized by the medical field. If the symptoms are severe enough to interfere in day-to-day life, they could be referred to as the effects of chronic fatigue syndrome but are otherwise simply referred to as "general fatigue."

If adrenal fatigue doesn't exist, why do we know and talk about it?

The Origin of Adrenal Fatigue

"Adrenal fatigue" refers to a reduced capacity—or fatigue—of small organs called adrenal glands, situated on top of our kidneys. A lay hypothesis suggested underperforming and fatigued adrenal glands release fewer stimulating compounds called catecholamines, which play a role in the fight-or-flight response to stress. However, this hypothesis did not take the rest of the body into account and was discredited by scientists.

The stress-response system—or the hypothalamic-pituitary-adrenal axis (HPA)—plays a major role in chronic fatigue syndrome because it mediates both the suppression and release of hormones that modulate stress, as well as how the organism (you) perceives the stress. As its name suggests, the HPA is characterized by the interactions among the hypothalamus, pituitary gland and adrenal glands. The HPA is involved in regulating a host of the body's systems, including the cardiovascular, metabolic and central nervous systems.

The HPA is also the system that—when malfunctioning due to high daily stress—increases cortisol concentrations in the blood and alters catecholamine secretion, which can then cause negative health effects over time, such as increased belly fat.

If the adrenals are involved in overall stress response, why is adrenal fatigue a false diagnosis? Though it may seem like an issue of semantics, using the correct term is important because adrenal fatigue implies targeting the adrenal glands with supplements could potentially help alleviate fatigue, when that is not the case. Most supplements designed to alleviate adrenal fatigue are meant to aid the adrenals without considering the rest of the body. At worst, the supplements ride on the buzz status of "adrenal fatigue" and don't actually include any ingredients remotely related to the stress-response system.

For example, some supplements marketed toward adrenal fatigue contain vitamin C because early research on adrenal glands found that stressed adrenal glands are more oxidized. Vitamin C was used to measure the level of oxidation in the adrenals (2,7). While it is technically true that stressed adrenal glands are more oxidized than their unstressed counterparts, and that a deficiency of vitamin C reduces catecholamine secretion (1), both of these statements are misleading in the context of actually alleviating fatigue. Supplement companies put these claims on their products and include vitamin C because it helps sell products.

Vitamin C is actually released alongside catecholamines (5) by the adrenal glands. Adding it to an anti-fatigue supplement disregards the details of how it interacts with the rest of the body, especially because it has not shown any promise in clinical trials to alleviate stress or fatigue when taken as an oral supplement.

It's easy to attribute symptoms to adrenal fatigue because marketing and alternative medicine perpetuate the myth that the "disease" exists.

"Adrenal fatigue"—sometimes called "hypoadrenia" in the past—is a term often attributed to James L. Wilson, who has a doctorate in human nutrition and authored "Adrenal Fatigue: The 21st Century Stress Syndrome" in 2001. While the holistic and naturopathic communities regularly refer to and offer treatment for adrenal fatigue, the medical community does not recognize the condition, according to Mayoclinic.org.

If Not Adrenal Fatigue, What Then?

Lifestyle modifications meant to combat adrenal fatigue are usually also effective at alleviating daily stress and overall fatigue, which seems to suggest adrenal fatigue is just general fatigue masquerading under another name.

Athletes—especially those training or competing with great intensity—need to be particularly in tune with their recovery process in order to avoid dealing with prolonged fatigue (generally referred to as “overreaching,” the prolonged fatigue that occurs prior to legitimate overtraining). Unhealthy sleep patterns and caloric restriction can both contribute to poor recovery and eventual fatigue. If you’re feeling fatigued, evaluate your sleep and dietary habits in order to identify potential areas for improvement.

People struggling with fatigue should also avoid alcohol, particularly at night. Alcohol will impair sleep quality even if you’re already asleep. If you’re frequently waking up exhausted, consider abstaining or cutting back.

Misusing stimulants and stimulant withdrawal can also increase overall fatigue. Too much stimulant use can result in the body’s attempting to adapt to the new compound, which can ultimately lead to low energy levels. For example, if a stimulant—such as caffeine or **1,3-dimethylamylamine (1,3-DMAA)**—increases dopamine levels, the body does not need to produce as much dopamine during ongoing supplementation. If supplementation stops, it will take some time for the body to produce normal amounts of dopamine. This period of time is called withdrawal.

The post-stimulant crash may also be misinterpreted as general fatigue. For example, taking caffeine as a pre-workout supplement might result in reduced energy levels for the rest of the day. Stimulant withdrawal can also result in a drop in focus and attention span. In order to break the cycle of stimulants followed by a crash, stop using the supplement until your body no longer expects the compounds and is no longer suffering from withdrawal.

Stimulant sensitivity can vary between individuals. Just because your workout buddy drinks more coffee than water doesn’t mean you should be trying to do the same thing.

Dealing with withdrawal can be difficult. Time is the most effective tool, but adaptogen supplements can also help with some of the symptoms of withdrawal. For example, **Rhodiola**

rosea is an adaptogenic herb that has shown promise in preventing nicotine withdrawal when administered to rats (3,4). Ultimately, waiting out withdrawal is the best option.

Fighting Daily Fatigue

The best way to reduce daily fatigue is to enjoy a varied diet, exercise frequently and get plenty of healthy sleep. Healthy sleep is characterized by a quiet, dark environment and a regular sleeping schedule.

Supplementation for fatigue relief is risky because those same supplements could result in increased fatigue after the energy they provide dissipates. Even worse is trying to supplement away a condition that doesn’t exist—such as adrenal fatigue. You should have a good reason for the supplements you take.

If fatigue persists after lifestyle and dietary adjustments, consider talking to your doctor about chronic fatigue syndrome. ■

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Michael Brian/CrossFit Journal

If you’re feeling run down, perhaps a leisurely day at the beach will recharge your batteries.

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About the Authors:

Kamal Patel, Examine.com director, is a nutrition researcher with master’s degrees in public health and business administration from Johns Hopkins University. He is on hiatus from a Ph.D.

in nutrition in which he researched the link between diet and chronic pain. He has published peer-reviewed articles on vitamin D and calcium as well as a variety of clinical research topics. Kamal has also been involved in research on fructose and liver health, mindfulness meditation, and nutrition in low-income areas.

Kurtis Frank, Examine.com director of research, graduated from the University of Guelph with a bachelor’s degree in applied human nutrition. His research work on Examine.com began while he was still a student. Upon graduating in the spring of 2012, he began gathering and analyzing research on supplementation and nutrition full time. A recreational bodybuilder and powerlifter, Kurtis has a passion for dietary supplements due to a desire to harmonize the discord between the preventative and rehabilitative potential of some dietary supplements and the medical community’s lack of interest in combining supplements and preventative medicine. Kurtis strives to expose the supplements rife with inefficacy and insufficient data in order to uncover the diamonds in the rough.