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In Loving Memory

Members of the CrossFit community explain how they cope and heal after losing a coach or member.

BY ELEANOR BROWN



Shawn Thumma (left) and Colin Woodside share a moment of reflection after a tribute workout in Lauriel Luther's honor

Dan Hollingsworth



Before Luther passed, her mantra became part of a T-shirt representing her fight.

Dan Hollingsworth

At Kitsap CrossFit, Moani Daniel was known as reserved but friendly, a hard worker who never complained about anything—not even workouts with her least favorite component: running.

Fellow member Lauriel Luther was seen as a powerful athlete and a positive person. Luther had competed in the 2010 CrossFit Games South West Regional and was always focused on helping others.

Within weeks, Kitsap CrossFit lost them both.

On March 9, 2014, Daniel died of a rare complication during childbirth. On April 2, Luther passed away after a lengthy struggle with brain cancer.

“We knew that Lauriel was in the final throes of her battle with cancer, and so we had—to some degree—been preparing ourselves for that moment, and then to get blindsided with Moani’s death was a real shock to the system,” said Dan Hollingsworth, program director at Kitsap CrossFit in Poulsbo, Washington.

CrossFit athletes are accustomed to supporting each other through struggles with the barbell and in search of PRs, but coping with grief is a new experience—until it happens.

“The unfortunate reality is that you’re occasionally going to lose some people, and that’s just a part of life,” Hollingsworth said.

And yet, he admitted, “We certainly don’t have an action plan for this.”

None of the boxes discussed below had a plan for dealing with the death of a member or coach. They wrestled with the process blindly—from notifying their members to creating memorials to supporting each other through mid-workout bursts of grief. But examining the decisions they made shows that loss affects affiliates in similar ways, and that boxes can learn from each other in order to support their communities through a difficult time.

Sharing the News

One of the first issues a box faces after a death is how to share the news within its community.

Laura Hart of CrossFit Indulto in Sandy Springs, Georgia, described coach Tim Barta as “one of the best people you’ve ever met”: humble, giving, and passionate about CrossFit and coaching.

When he died unexpectedly in October 2014, Hart was shocked.

“Your first thought is, ‘How do you deal with it? How do you tell people?’ Because we’re not a big gym, every time someone comes or goes it makes a huge ripple, and so I think I was nervous about the sadness and having to tell people.”

Hart said she and her husband, Ryan, “were really hesitant to make announcements via social media, because we felt like that’s not what it’s for, and that people deserved to hear it from us. We tried to do it more one-on-one.”

But when the news began to spread on Facebook, “We had to improvise.”

At Kitsap CrossFit, Hollingsworth took a different approach.

“Our goal was to let our members know before they just happened to log onto Facebook and see something or before they heard some rumor around the gym.”

As active writers, he and partner Amy chose to share the news on their blog.

Most of the affiliates discussed in this article posted the news of the member’s passing on the social-media platform they use most regularly—usually Facebook or the box’s blog. Often, out of respect, they contacted the family before sharing any information.

But once the news was out, the journey had only just begun. And the next step for every box was to bring their members together physically to share information and, most importantly, to grieve.

Gathering Together

Fredda Wasserman, the clinical director of adult programs and education at Our House, said coming together as a community as soon as possible is vital. Our House is a grief-support center with locations in Los Angeles, California, and Woodland Hills, California.

Attendance does not have to be mandatory, but she recommended “a formal invitation to a time that is set aside specifically for this, because grief is something that really needs to be shared.”

Wasserman explained the gathering doesn't have to be a traditional memorial.

“Whatever way that people decide to do it, it's just to be in the company of others and hear other people's memories and be with people who really understand because they knew that person, too.”

That connection is exactly what Natalie Garcia of Viking CrossFit in Orem, Utah, wanted. Member Katrina Lawrence, Garcia said, “just kind of sparkled. She was one of those people where you were better for knowing her.”

“We just needed to be with each other, we needed to talk about it, we needed to cry together.”

—*Natalie Garcia*

When Katrina died in childbirth in May 2013, Garcia immediately posted an invitation on Facebook, announcing a gathering that night at the box.

“We just needed to be with each other, we needed to talk about it, we needed to cry together.”

Hart felt the same way. Coaches cancelled classes at CrossFit Indulto the evening of Barta's viewing to allow everyone in their box to attend, and they gathered together afterward as well.

“Where else can you go?” Hart asked. “Nobody understands or gets it. CrossFit is weird; it attaches you to people in ways that



Brian Sullivan/CrossFit Journal

Conrad Jackson (in yellow) paid tribute to fallen fire-fighters at the Hotshots 19 memorial workout in August 2013 in Arizona.

Sharing the Loss

In August of 2013, Richard Millsap was leading a class at his box, CrossFit Mosaic, in Winter Garden, Florida, when a man walked in and shot him twice. Millsap was killed.

Jeremy Brassard, head coach at nearby Armor CrossFit in Ocoee, Florida, was stunned by the news. He and Millsap had been professionally friendly, and Brassard described him as “the epitome of what a CrossFit coach should be.” He said Millsap was committed to making a difference and thought of CrossFit Mosaic as a way to give and minister.

When Brassard heard of Millsap's death, he thought immediately of the family left behind.

“I'd met his wife, I'd met his kids, and I'm a dad. I have four kids. I thought, ‘What if this happened to me?’ I felt like we had to do something.”

Immediately, Brassard reached out to other Orlando-area box owners, and together they held a fundraising workout to benefit Millsap's wife and children. When the word spread, affiliates across the country joined in.

“We had boxes from places I'd never even heard of sending us checks,” he said. Their fundraising efforts raised well over US\$40,000 in Millsap's honor.

Members of CrossFit Mosaic were invited to work out at Armor CrossFit, with their membership fees to be paid directly to Millsap's widow, Karen. And while CrossFit Inc. offered five complimentary spots in Level 1 seminars to athletes interested in taking over at CrossFit Mosaic, the gym eventually closed. But Brassard said there are about 14 people from Millsap's box who are now members of Armor CrossFit.

Brassard wasn't surprised by the support the event and the Millsap family received in Orlando and across the country, nor did he think he did anything unusual.

“That's how CrossFit should be,” he said. “When it comes to another box, we're an extended family. This is all much, much, much bigger than us. I think we have a responsibility to each other.”

other people just can't understand. People who hardly knew Tim outside the gym feel this loss because they still saw him every day. It's just a different kind of relationship, but that doesn't make it any less important."

That different kind of relationship means a different kind of mourning.

Powerful Emotions

Wasserman said grieving the death of someone such as a co-worker or a box member—as opposed to a relative—can be an unfamiliar experience.

A key pain point is that people outside the box don't recognize the emotional impact of the loss.

"If your close family member dies, everyone extends their condolences to you and checks in on you and recognizes that you're going to be going through a lot of emotions. When it's at a community like the gym, people don't get that. They don't send you a condolence card. They don't ask how you are doing without this person," Wasserman said.

To people outside CrossFit, the hole left by a member's or coach's passing is inexplicable. Hollingsworth described the struggle this way: "It's so hard to express to people who aren't a part of CrossFit. People are like, 'I have a community,' and I'm like, 'Yeah, I'm sure you do. But this is different.'"

Emotions can run high at CrossFit gyms. Affiliate owners and coaches are used to tears and anger, frustration and fear. But having those emotions arise from the death of a community member is new territory.

Affiliate owners and coaches are used to tears and anger, frustration and fear. But having those emotions arise from the death of a community member is new territory.

Hart said reactions to Barta's death ran the gamut from curiosity (after almost four years in recovery, he died of a drug overdose) to anger to great sadness.

"(There were) people coming in and just crying. You'd be in the middle of a workout and something would come up. This hour is your time to get away, and when what you're trying to get away from is here, what do you do?" Hart asked.

The only answer to that, said Hart and the other box owners, is to allow the feelings to happen and to support people through the mourning process.

"As far as grief goes, you just let people deal with it how they're going to deal with it. And sometimes that's just that you shut up and listen. Let them talk and just love 'em," said Jeremy Brassard, of Armor CrossFit in Ocoee, Florida (see sidebar on Page 3).

Remembering and Honoring

To help cope with the loss and create something positive, each of these boxes created two things: a named workout and a fundraiser in the decedent's honor.

The workout itself served an important purpose.

"The CrossFit box is a place for people to work things out, and when you have a tragic event like this, people need to see each other and hug each other and support each other, and at the same time they need to grunt and groan and sweat and cuss. It's cathartic. It definitely helps," Hollingsworth said.

Some of the boxes either do or plan to do the named workout on an annual basis as an opportunity to remember the athlete they lost and honor their community's grief.

Garcia said doing Lawrence's workout on the first anniversary of her death was a different experience.

"A year later was a little bit easier. It was still somber, and people were quieter during that workout because it's for a special purpose. But before and after the workout we would share memories, so it was a little bit on the lighter side because we're past the shock and we're able to celebrate her memory."

The second act, holding a fundraiser, brings both tangible and intangible benefits. The purpose is often to financially help the family of the member who passed or to support a good cause. Kitsap CrossFit donated money in Luther's honor to a military



Brian Sullivan/CrossFit Journal

At the Hotshots 19 memorial, butterflies were released before CrossFit Games athlete Dan Bailey led the VIP heat in prayer.

charity. And Barta's family elected to have the funds raised by CrossFit Indulto go toward a scholarship for athletes interested in earning a CrossFit Level 1 Certificate.

Representatives from each affiliate also mentioned how meaningful the participation of other boxes was to them, whether community members donated money or simply did the workout.

"Everybody has their own CrossFit community within their own gym, but then to have something like this happen and actually feel that family and that love from the CrossFit community throughout the world was absolutely an amazing experience," Garcia said of the international support of their fundraiser.

But working on the event also funneled energy into something positive.

"It allowed people to put their grief into something. So whether it was channeling their grief into the workout or into organizing it, I think it was like a celebration of Tim instead of mourning him, which he probably would have liked," Hart said of CrossFit Indulto's "Throw-in for Tim" workout fundraiser.

Viking CrossFit ended up putting together a large, successful fundraiser to benefit the Lawrence family in Katrina's honor, including a silent auction and a raffle for a car. But the work of organizing the event meant the most.

"For us to be able to put together something like that for a friend that we loved, that's all we could do. That absolutely helped us in the healing process," said Garcia.

Stronger Than Before

As Kitsap CrossFit realized last year, it's entirely possible for any box to lose one of its members or coaches, often without warning.

This is why it is so important, Wasserman said, to "have these conversations now, when nothing is imminent."

If a box's leadership has discussed the possibility of death and how to handle it, community members will not be shielded from sadness, but they might be able to focus their energy on supporting each other and planning ways to honor and remember their departed friend.

And despite their pain, these affiliates have found ways to look at the positive effects.



Dan Hollingsworth

Mike Stadshaug offered some reps in memory of the departed at CrossFit Kitsap.



Brian Sullivan/CrossFit Journal

“People have a deeper connection with each other because of having gone through these unfortunate events and having been there for each other in a way that they hadn’t ever expected in a gym.”

—Dan Hollingsworth

“I think it has changed us, but I don’t think it’s bad,” Hart said. “I think people remember (Tim) and love him and know that bad shit happens to good people, and you kind of have to pick it up and move on. But I feel like it’s brought us closer together.”

Garcia saw the impact on two levels at Viking CrossFit: “I think everybody realized how important we are to each other, and that our community is more than just a place to work out. And on an individual level, it just makes you realize how precious life is.”

Hollingsworth believes the community’s grief over losing Daniel and Luther strengthened its connections. “I don’t know that it’s visible, that someone would walk in and be able to palpate why, but I know that because of these things, bonds have been formed between people that are unlike the bonds that they had before.”

He added: “People have a deeper connection with each other because of having gone through these unfortunate events and having been there for each other in a way that they hadn’t ever expected in a gym.” ■

About the Author



Joe Henson NYC

Eleanor Brown is the New York Times and international bestselling author of the novel “The Weird Sisters,” and of the fitness-inspiration book “WOD Motivation.” She has been doing CrossFit for three years and trains at CrossFit Modig in Highlands Ranch, Colorado.

“The comfort of having a friend may be taken away, but not that of having had one.”
—Seneca

THE CrossFit JOURNAL

Master of the Many

It takes great skill to manage a large group of athletes. Affiliate owners share how they learned to do it and how they're teaching others to be leaders.

By Emily Beers

April 2015



Euan Robertson

Coaching a group class is a bit like being an offensive lineman on the football field: When you perform well, you're not always rewarded, but it's incredibly obvious when you mess up.

When you're disorganized and don't pay attention to the small details, your class can quickly spiral into a sea of chaos and confusion. But when you master how to properly coach a group of 20 people, classes appear to run almost effortlessly.

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Courtesy of Jonas Deffes

Jonas Deffes (right) says coaching large groups is about carefully managing growth, not taking on more than you can handle and then easing other coaches into it.

In the 2006 CrossFit Journal article “Scaling Professional Training,” CrossFit Inc. Founder and CEO Greg Glassman wrote about the challenges of the transition from working predominantly in a one-on-one setting to coaching group classes. As a solution to a busy schedule, Glassman started training his existing clients in pairs and slowly moved to larger groups.

“To run group classes without compromising our hallmark laser focus and commitment to the athlete, the trainer has to learn to give each member of the group the impression that he is getting all the attention that he could get in one-on-one training, and that requires tremendous training skill,” Glassman wrote of one of the challenges.

It’s been nine years since Glassman wrote the article, but coaches today are continually faced with the same challenges Glassman identified: It can be daunting to stand in front of a large, diverse group of athletes and give useful cues and advice so each one gets a great workout with the right loads and modifications. Coaches are also tasked

with managing the group and ensuring the class starts and finishes on time, the workout is safely organized, and athletes are always listening and following instructions. Through it all, coaches are expected to be engaging and inspiring.

So how does the affiliate owner get coaches ready to lead and manage a large group with skill?

Slow and Steady: From One-on-One to 100

Jonas Deffes of Supra CrossFit in New Orleans, Louisiana, followed a path similar to Glassman’s. He began his fitness career as a personal trainer. He started training clients in 2003, and when Hurricane Katrina destroyed everything he owned, he moved to Florida in 2004. He began to educate himself in CrossFit methodology, which he used on his personal-training clients. Eventually, also like Glassman, Deffes turned his one-on-one sessions into small group classes when his schedule grew too busy. Before he knew it, he was running a successful boot-camp business.

“Boot camps allowed me to leverage my time,” said Deffes, whose classes quickly grew from 10 to 20 to 50 and beyond. Eventually 100 people were showing up. His classes, which were held in a park he leased, were so consistently large he at one point hired a cop to direct traffic.

For Deffes, being able to handle large numbers was all about carefully managing his growth.

By 2012, Deffes knew CrossFit affiliation was what he wanted. He earned a CrossFit Level 1 Certificate and opened his affiliate in January 2013. Supra CrossFit now has 350 members.

For Deffes, being able to handle large numbers was all about carefully managing his growth. He was patient and never took on more than he knew he could handle. He believes this approach was key to his success.

“Make sure you grow your classes at a rate you’re able to manage. Going from one to 15 might be too big of a jump,

so you might want to start with a group of six people. Then try 10. Then move to 20," Deffes explained. "And by the time you get to 50 people, you know you can probably teach as many people as possible."

Similarly, he believes you should employ the same technique when teaching a new coach: Ease him into larger groups of athletes carefully and avoid throwing him into situations he's not ready for. It's up to the affiliate owner, or the coach's mentor, to recognize what his mentee is capable of.

At Deffes' affiliate, his new coaches start by shadowing a more senior coach. They watch silently on the sidelines until they're comfortable cueing and correcting form. Deffes believes this process is important for two reasons: It ensures the new coach builds confidence, and members get used to—and start to trust—the new coach.

"Your clients will gradually see this person moving up through the ranks, and then eventually the main coach

will let the new coach lead the warm-up or the strength portion of the class," he said. "Gradually do it in steps to make sure the new trainer is coming along and is getting properly acclimated."

Winston Thompson is another affiliate owner who coached boot camps prior to opening CrossFit Tipping Point in Norcross, Georgia, in 2014. His classes are still small and manageable—usually fewer than 10 athletes—but he's confident his boot-camp experience will allow him to easily handle larger classes as his affiliate continues to grow.

And when he grows large enough to take on a new coach, he's going to proceed as Deffes did and build up his coaches slowly and systematically. This concept is something Thompson also learned during his boot-camp days.

"You need to be careful of what kind of responsibilities you pass along (to new trainers). Be mindful if you're making people do something that's out of their skill set. But if they're coaching something they're really good at,



Courtesy of Jonas Deffes

Before affiliation, Deffes leased a park for boot-camp classes. As his business grew, he learned more and more about class management.

they can knock it out of the park and gain confidence,” Thompson said. “It’s like a quarterback. At the start of the game, he makes a lot of short passes to gain confidence, and then longer ones later on in the game.”

Thompson believes being mindful of strengths and weaknesses helps a new coach develop confidence and personal style. Coaches still need to follow the appropriate class format of the day, but the delivery of the class comes down to individual personality.

“When you try to get someone to do something exactly your way, it doesn’t work as well. It’s going to be much more organic if you let them do it their own way, as long as they follow the right structure,” he said.

Challenges and Solutions

Even when you train your coaches carefully, challenges always appear when dealing with groups. Diversity is a common stumbling block.

A group class can be made up of people of varying levels, ages, and athletic and health backgrounds. One athlete

might be recovering from the flu, another has arthritis, and a third is attending her first group class. Several others might be very experienced.

It’s important to know exactly how to cue so you connect with those who need the coaching without interrupting the flow of the class for other athletes. Deffes learned a trick that worked for him when he was coaching oversized classes, and he still employs it today.

“You become like a human whiteboard dictating the workout, cueing the movements to the group,” he said. “You might be coaching 10 people, and only one person has bad form. But you can basically give a cue that can help everyone, and I guarantee there is one more person doing it wrong, too, and now everyone hears.”

For instance, rolling through the points of performance for a squat will help new athletes move properly, while simultaneously fine-tuning the more experienced athletes. The more cues—and ways to explain movements—you have in your toolset, the better. Diversity will help make sure athletes don’t feel as if they’re hearing the same generic cue for the 10th time that week.



Israel Woolfolk

Athletes with diverse skills present challenges, but experienced coaches are able to quickly adjust workouts to ensure each client gets what he or she needs.

Thompson agrees handling diverse fitness levels can be challenging for a new coach, and he has his own solution: "The biggest thing is that you have to listen and talk to your athletes. You need to find out what they need from you on an individual basis that day."

Thompson ensures he talks to his athletes during warm-up, and from there he scales individuals according to their feedback.

Thompson also uses experienced athletes to help the less-experienced ones. He often pairs an experienced athlete with a novice during a strength session, so the novice can learn by watching a partner.

"And our experienced athletes usually take pride in what they're doing and enjoy showing others what they've learned," he said.

Technical coaching aside, it can be challenging to create personal relationships with your clients when you're in a large group. Deffes, however, sees the group class as a great opportunity because group sessions are generally free of the personal distractions and drama that came up when he was a personal trainer.

"Personal training ended up being a therapy session and took away from the workout. . . . It would distract from the training aspect of it," Deffes said. "When you shift to group training, there's no time to talk about Nancy's problem with her relationship or John's date last night because all you have time for is to instruct the class."

**Have you heard a new coach
timidly call a class to order,
sometimes speaking so quietly no
one can hear?**

Deffes strives to create and maintain tight relationships with clients, but he believes the time for chitchat is before and after class.



Alyssa Porter

Coaches need to ensure they interact with each member, but they also need to ensure they don't spend too much time with one athlete at the expense of 10 others.

"There's still the community feeling, but when you're teaching the class it's more about the workout. Just like any teacher, it's all about the information you're trying to give them. So you're focused on what counts more: the exercise program, that their form is right, that the energy is good," he said. "Then after class you can be social."

Similarly, Patrick Lyden of CrossFit EXP in Leominster, Massachusetts, builds social time into his group classes. His sessions are structured so there's always a 15-minute break between them, meaning coaches have 15 minutes before and after class to connect with members.

"In a group, you want to reduce drama in people's lives, not add to the drama," said Lyden, who was formerly a microbiologist and personal trainer.



Patrick Lyden

Being clear and being heard are important to Patrick Lyden, who makes a point of speaking loudly and turning down the music during explanations.

To ensure coaches are connecting with each member during class—even if it’s about the deadlift as opposed to a date the night before—Lyden instated what he calls a “three-touch rule.”

“During the class, each coach needs to connect with each member three times, typically at the beginning or before class, the middle and the end of class,” Lyden explained. He believes this is an easy way to ensure members feel they’re being adequately coached and cared for.

Another issue—and one Glassman alluded to briefly in “Scaling Professional Training”—is speaking volume. Have you heard a new coach timidly call a class to order, sometimes speaking so quietly no one can hear? Lyden thinks volume is one of the biggest challenges for a new coach.

“When you first start out, especially in a big space like a CrossFit box, you have to yell,” he said, explaining new

coaches often don’t realize just how loud they have to holler in order to capture everyone’s attention.

Lyden focuses on speaking slowly and clearly, also making sure no distractions are present. For example, he takes the time to turn down the music during explanations.

If coaches struggle with volume, Lyden believes things such as whistles can help at times. He used a whistle when he taught outdoors, and just for fun he brought it to class recently. It made everyone laugh, and it helped keep things fun and fresh.

Thompson believes the issue is often less about the natural volume of a person’s voice and more about confidence and presence. Both increase in magnitude over time.

“I’ve seen people be very successful as coaches that you wouldn’t expect would be good because they’re timid. But then when they jump out in front of everyone they command attention,” Thompson said.

This command comes naturally as a coach gets comfortable and gains respect from his athletes.

Finally, time management is crucial to running a smooth class. New coaches can get caught up helping someone, and the entire class spills into the next hour, creating a vicious cycle that’s repeated each hour.

Lyden has a simple solution: Use a timer.

If the new coach holds himself to a timer, he’s less likely to ignore the ticking clock and run overtime. Time caps on workouts also help, as do repeated warnings that remind athletes how much time they have for any part of the session. “Five minutes to finish your last set of front squats” goes a long way in keeping people organized. So does this: “I’m starting the clock for the workout at exactly 5:45, so make sure you’re ready to go.”

Preparation Is Key

The final piece of the puzzle comes down to being organized and prepared. Deffes learned that when coaching 100 people outside. The more people you have, the more details matter—from parking guidelines to timelines to the way people set up for a workout. For example, Deffes lined up

his boot-camp attendees specifically so they'd all be able to hear him. The same is true of a CrossFit class: Athletes need to know placement of mats, boxes and barbells matters.

That physical organization should be reflected in the coach's mind, as well. Lyden believes one of the most important aspects of running a quality group class is organizing your thoughts and planning ahead of time. He learned about preparation early in his career.

Patrick Lyden believes one of the most important aspects of running a quality group class is organizing your thoughts and planning ahead of time.

"My first appointment (as a personal trainer) was with a woman I had met at the health club. It was three hours long. I was so passionate about what I knew," Lyden said. "I filled her ear with so much information. Knowing how to gradually give information—as opposed to giving it all at once—was one lesson I learned."

Lyden joked he doesn't go into his daughter's bedroom and practice in front of stuffed animals, but he believes it's important to show up to class with a structured plan for the hour. This usually involves spending some time reviewing the program for the day, understanding the structure of the workout, having a good warm-up prepared beforehand, planning out scaling options and ways to modify workouts, and thinking about the coaching cues you might use that day. The preparation could also include having a joke to tell the class beforehand to get everyone laughing.

Lyden uses evaluations to help teach these concepts to his coaches. While it's common for senior coaches to evaluate new coaches, new coaches also evaluate more-experienced coaches at Lyden's affiliate. Specifically, the new coach must perform three evaluations on three different coaches.

Lyden explained there are certain things he wants the new coach to notice about class preparation and personality when evaluating others. What was the other coach's rapport like with the members? Did the coach start on time? Was the coach prepared? Did he or she introduce himself to new members? What was the energy and flow of the class like?

Lyden finds evaluations help new coaches recognize the smaller details necessary for classes to run smoothly.

"And it gives me a chance to see if existing coaches are sticking with what we want them to be doing. Coaches really step up their game at (evaluation) time," Lyden said.

That's a win for all parties.

Chaos and Order

When it comes to coaching a group class well, there's very little room for error.

Affiliate owners and coaches have learned when you're lazy with the details, sloppiness will start to take over the class. If you get stuck chatting in the corner and accidentally start a class five minutes late, the entire hour can get thrown off. Or if you don't make it clear how to scale a workout properly and let people run wild with their equipment, you'll suddenly find yourself in a room full of barbells rolling into each other with frazzled athletes chasing after them. And if you don't take the time to bother getting to know your athletes' individual strengths and weaknesses, you might find yourself losing clients fast.

Conversely, when coaches pay attention to small details, class run seamlessly. Suddenly, barbells and athletes are moving in unison and the coach starts to relax and feel like an experienced maestro in control of the orchestra.



About the Author

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

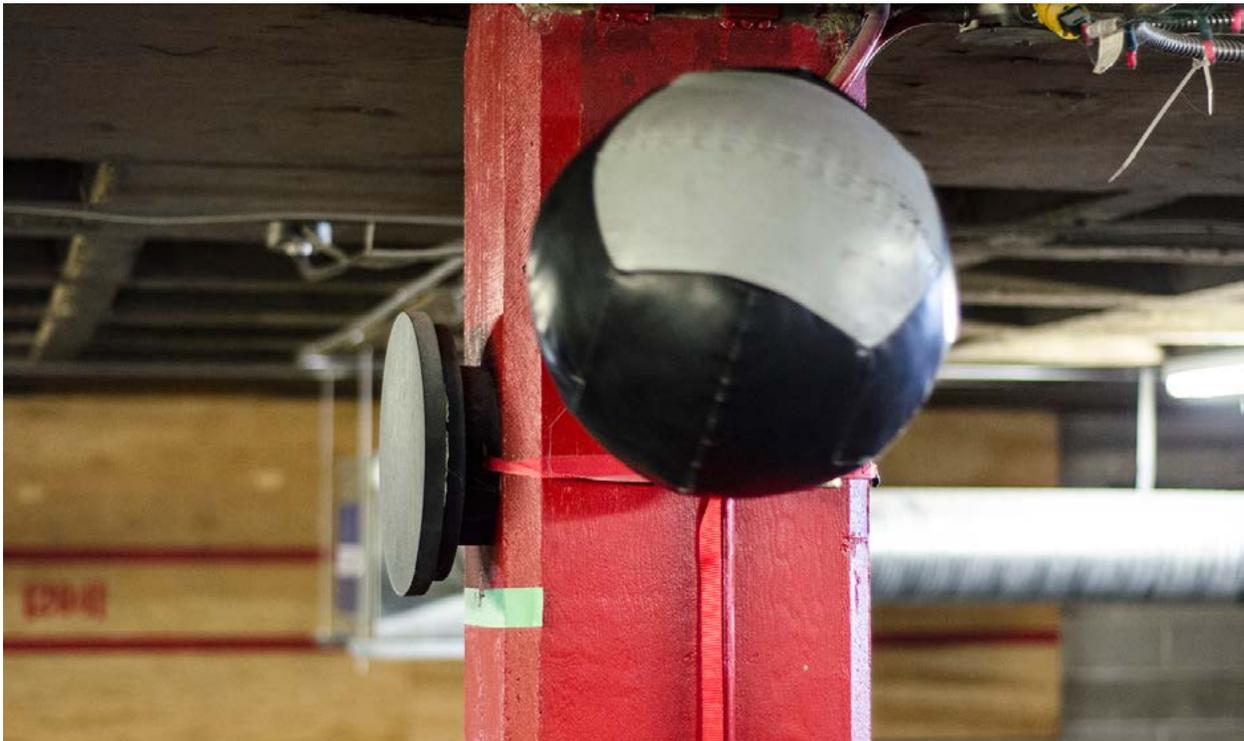
THE CrossFit JOURNAL

Periodization: Period or Question Mark? Part 2

Lon Kilgore reviews academic literature on periodization from 2000 to 2015 and finds little support for the NSCA's contention that classical periodization is superior.

By Lon Kilgore

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Mike Warkentin/CrossFit Journal

Available evidence suggests the dogmatic position the NSCA maintains on the use of classical periodization might be off the mark.

Models of periodization have been used in training for almost a century. The models of Mark Berry (1933), Bob Hoffman (1940), Bill Starr (1976) and Mike Stone (1976) periodized workloads by varying the relative heaviness of the weights on various days of the training week. This was the standard approach to periodization until the 1980s, when a Russian influence was felt in the West.

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Staff/CrossFit Journal

Matveyev's model of periodization is but one of many systems employed to help athletes accomplish their goals. Unfortunately, classical periodization is often presented as the best system, though research does not support definitive claims.

It should be noted that not everyone periodized training during this early era. A large component of the training population simply utilized linear progression, adding a little more weight or a few more reps in each session as tolerated.

Carl Miller, coach of the U.S. national weightlifting team, set the table for additional models of training in the early '70s when he imported Bulgarian methods. Similarly, Stone published work on periodization in the late '70s and '80s. Also in the '80s, Bud Charniga published translations of Russian training literature. All three primed the Western community for presentation of more elaborate models of training.

Academic evaluation of periodized training has historically been quite limited, and very few experimental papers on the topic were produced before 2000. Attention was firmly affixed to endurance training for heart health as weight training and high-intensity training were not accepted means of improving cardiac health. As a result, very few

(less than a dozen) actual experimental papers were produced on periodization of exercise in the latter part of the 20th century. Virtually all Western thought on the topic was rooted in theory, not data.

Leonid Matveyev's "Fundamentals of Sport Training" was the first periodization book to be made available in the West, and it became the de facto standard. The newly birthed National Strength and Conditioning Association (NSCA) embraced the Russian programming philosophy and began systematically preaching one of Matveyev's models of periodization as the best approach to training, though it should be noted Matveyev presented more than one model in his book. The Russian influence was wholly embraced by the NSCA because the very first Certified Strength and Conditioning Specialist (CSCS) course was taught in part by Angel Spassov, a Soviet-trained émigré.

It's often difficult to have a coherent discussion regarding periodization because people generally do not get weaker or less fit when they train regularly on a periodized program. That fact provides many people all the ammunition they need to hold up periodization as the gold standard for training.

Periodization Primer

Classical periodization—Generally credited to Matveyev. Planned intensity (weight or difficulty) increases over time accompanied by simultaneous reductions in volume (reps, sets, time or distance). Sometimes inaccurately called linear periodization.

Reverse classical periodization—An inversion of Matveyev's model. Planned volume increases over time accompanied by simultaneous reductions in intensity.

Block periodization—Generally credited to Yuri Verkhoshansky, with Anatoliy Bondarchuk and Vladimir Issurin as later proponents. Training different physical qualities for a multi-week period (two to four weeks) then moving to the next most important quality (general to specific).

Undulating periodization—Generally credited to Charles Poliquin. Planned volume and intensity increases or decreases by workout or within another short time period (seven to 10 days).

Conversely, people generally don't get weaker or less fit when they use a non-periodized program or a program based on a periodization plan different from Matveyev's classical variation.

Without comparative data, the argument cannot be settled. Even though periodized programs have lots of anecdotal and some experimental evidence supporting their effectiveness, significant comparative data must be present for someone to definitively say a system of programming—classical periodization, for example—is best. Prior to 2000, there was virtually no such data. The NSCA—and the rest of us who bought into classical periodization as king of all programs—was operating on faith in Soviet science we neither helped create nor translated.

A New Millennium

There has been an upswing in the amount of research on strength training in the past 15 years or so. During

that span, academics started generating data that shows strength training improves fitness, health, mortality and quality of life. This new interest led to some—but not too much—investigation into periodized exercise training.

Examining the strength of classical-periodization literature requires library time. Using the search terms “periodization” and “periodized training” on the PubMed search engine at the National Library of Medicine produces 67 experimental papers relevant to periodization, published from 2000 to 2015. Dozens more review and methods papers can also be found, but such papers cannot be used to make a case as they present opinion, rehash previous research or simply propose instructions on implementation.

The pressing question we want the literature to answer is this: Can the NSCA unequivocally state that classical periodization is superior to all other programming methodologies?



Chad Hamilton

In one research paper supporting the classical model, only the bench press and leg press were periodized and studied. That “partial periodization” is an abrupt departure from Matveyev’s model and forces readers to question the value of the study’s conclusions.

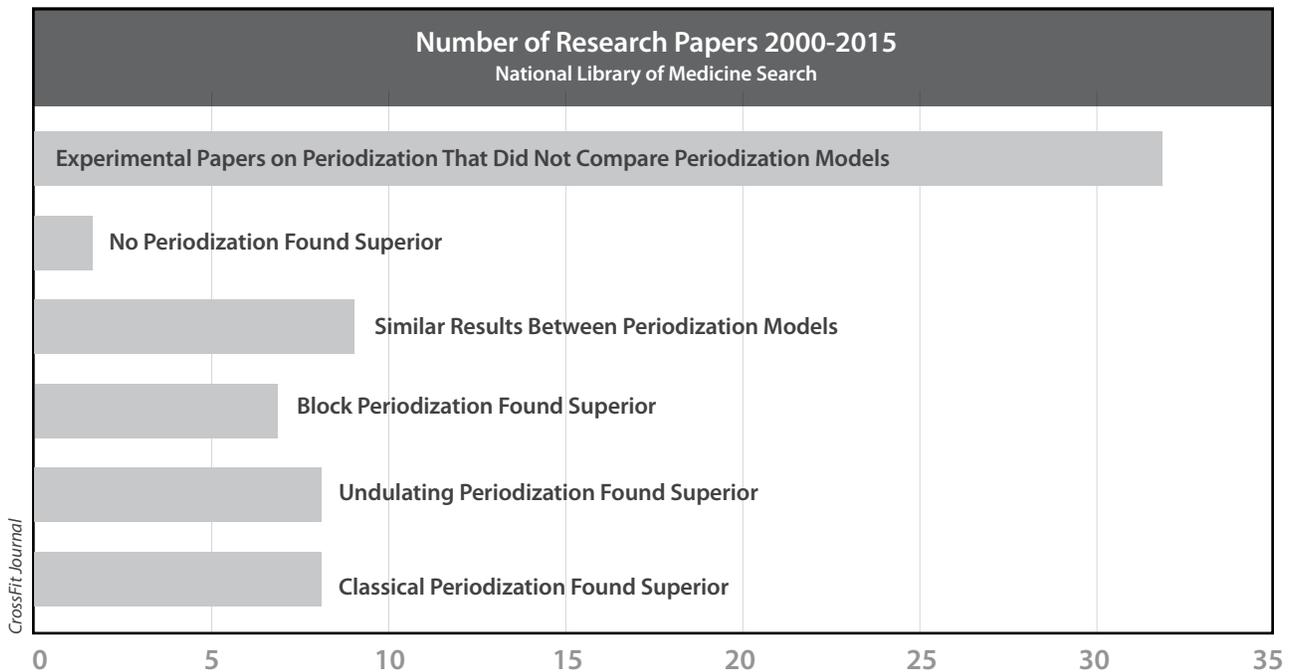


Figure 1: A survey of research papers reveals a large number made no comparisons among periodization models, while papers that compared the effectiveness of different models came to disparate conclusions.

The Hard Facts

So how many 2000-2015 papers actually present data that can support the NSCA's contention that classical periodization is clearly the superior method? Eight.

Eight papers that conclude classical periodization is better than other programming models might seem like enough. Indeed, eight research groups all coming to the same conclusion would be powerful if they all used the same methods, durations and populations; measured the same outcomes; and implemented Matveyev's original model. These papers did not do any of these things.

An example of this problem can be seen in one paper's periodization of only two exercises (bench press and leg press) according to Matveyev's model. All other exercises used in that experiment were not periodized—a rather significant departure from Matveyev's model and NSCA instructions, as NSCA instructions on periodization do not include partial periodization of individual workouts. Although there are a wealth of methodological problems in this paper—and others—the findings of these eight papers are generously considered here in support of the NSCA's position.

But there are more questions to be answered.

How many papers published between 2000 and 2015 presented data indicating classical periodization was less effective than no periodization at all? Two.

How many papers published between 2000 and 2015 presented data indicating the block-periodization model was more effective than classical periodization? Seven

How many papers published between 2000 and 2015 presented data indicating the undulating-periodization model was more effective than classical periodization? Eight.

How many papers published between 2000 and 2015 presented data indicating some other model of periodized training yielded similar results to other models of classical periodization? Nine.

This information hardly paints the picture of classical periodization as the best programming model in existence, something worthy of being dogmatically recommended as the linchpin of all exercise programming. Rather, this information suggests the model is just one tool in an arsenal of potentially useful approaches to improve fitness. In light of these studies, classical periodization is a tool that should be used at the right time and for the right purposes, not blindly applied to all fitness trainees.

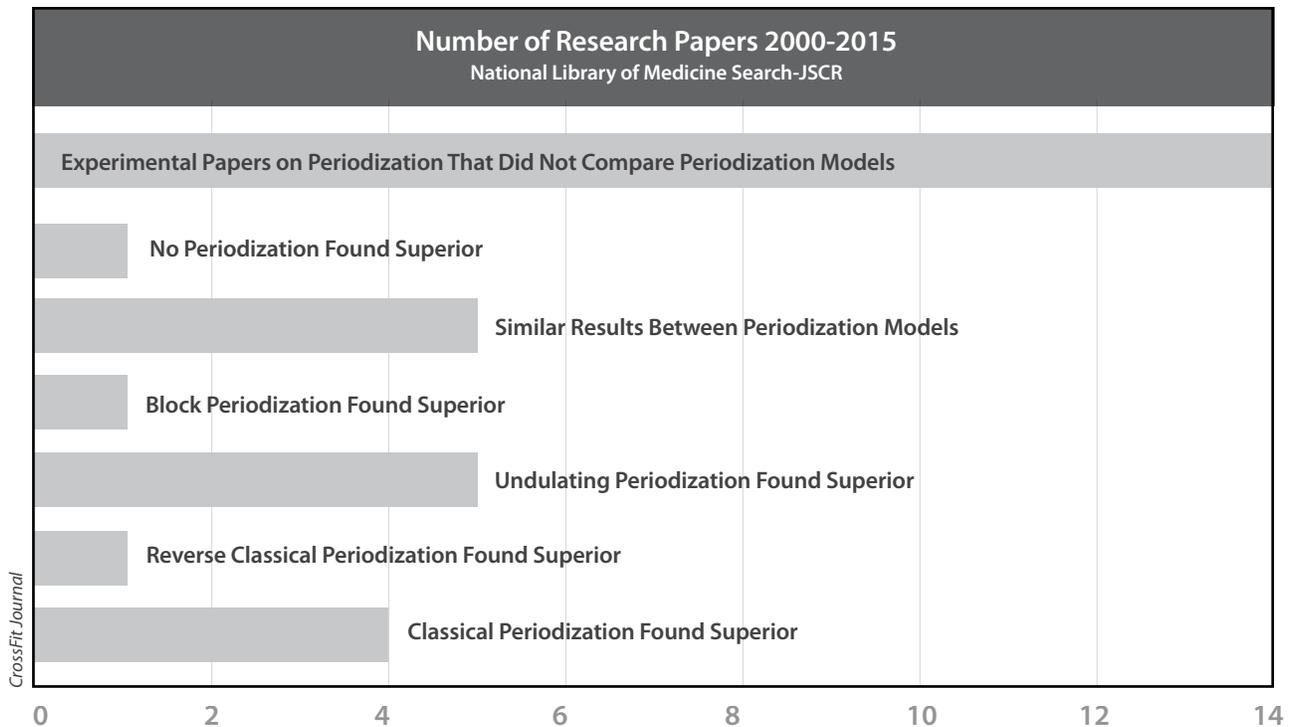


Figure 2: Of 31 periodization papers published in the Journal of Strength and Conditioning Research, 14 made no comparisons among models, and the other 17 produced conflicting information.

But Periodization Works!

Thirty-two of the 67 papers included here found periodized training of some type led to fitness gains for their subjects. These papers can be used to demonstrate periodized training does produce positive results, but they cannot be used to demonstrate the superiority of one model of periodization over another or superiority over any other exercise-programming model.

Because these papers make no direct comparisons between two or more models, they offer little in the way of definitive answers. These papers also suffer from the same problems as the aforementioned comparative papers—different methods, different durations, different populations, not measuring the same outcomes. Not only do these papers not enable comparison among periodization models within the experiment, but there is also no way to compare the results of these papers to other papers on classical periodization as the methods, populations and measurements were dissimilar.

The bottom line is we know classical periodization works, but we can only say it works about as well as any other systematically applied model of training.

Ignoring the Obvious

It's an interesting and telling observation that 31 of the 67 papers relevant to this topic were published in the NSCA's flagship journal, the Journal of Strength and Conditioning Research (JSCR).

The conclusions forwarded by the authors of those papers can be presented as follows:

- Supporting classical periodization as superior: 4
- Supporting undulating periodization as superior: 5
- Supporting block periodization as superior: 1
- Supporting reverse classical periodization as superior: 1
- Supporting no periodization as superior: 1
- Providing similar results among models of periodization: 5
- Papers on periodization that did not actually compare models of periodization: 14

It's certain there is no convincing and consistent evidence anywhere that classical periodization is clearly superior to any other model of programming. The overall literature

would suggest undulating and block periodization are just as good, and some evidence suggests other programming models are also effective. Simply stated, not enough high-quality research has been subject to replication to allow us to state that any model of exercise programming—regularly applied—is superior. Research only supports that these models work to some degree.

How can the NSCA promote classical periodization as the only scientifically supported programming practice—one that should be applied to all populations—when the evidence from its own journal does not support such a stance?

It's fine that the NSCA chose that position, promulgates materials supporting it and provides implementation instruction. Every professional organization has the right to adopt its own position stands. Having a system, believing in a system and teaching a system are good things.

However, why would a “world authority” on all things strength and conditioning want to adopt such a narrow and myopic approach?

History? Investment? Could the position be related to the fact that 28 current members of the JSCR editorial board and five current and past NSCA presidents are listed as authors on the papers identified here?

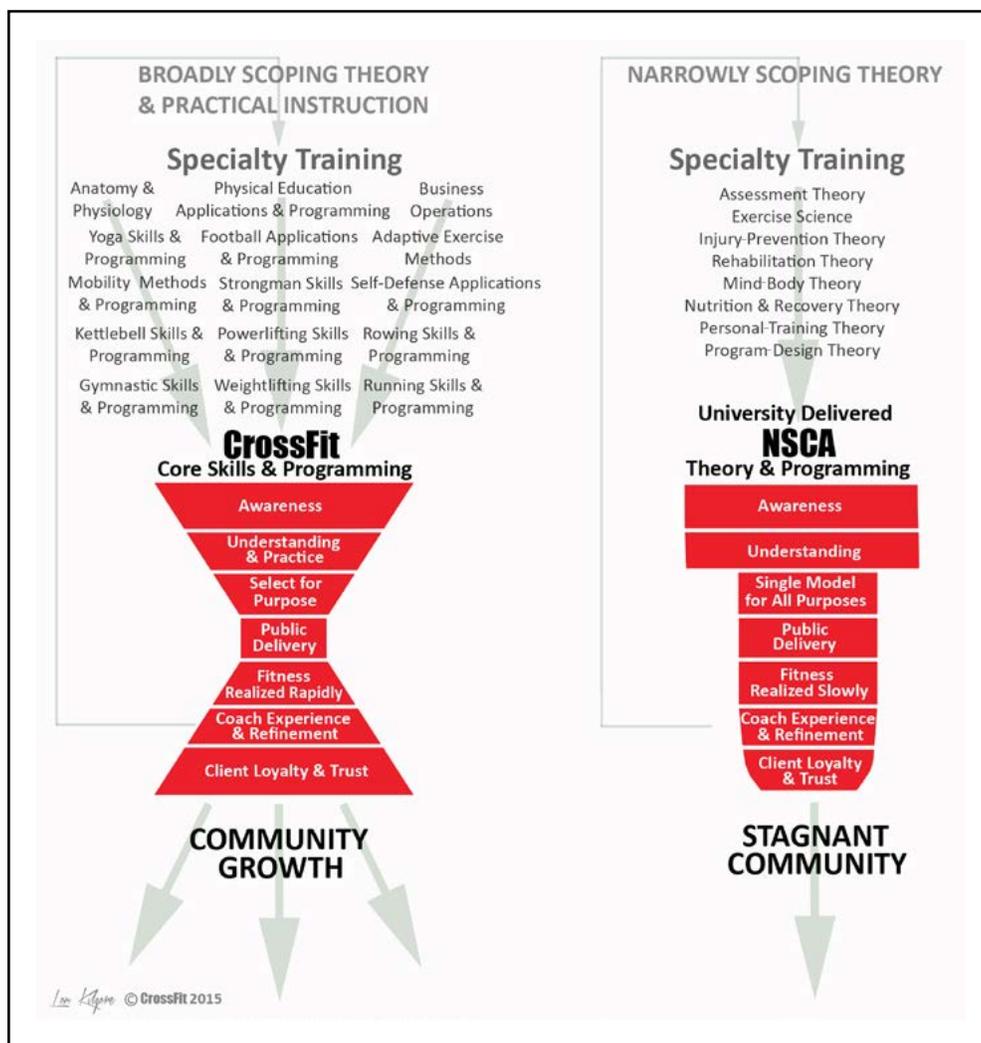


Figure 3: A comparison of CrossFit and NSCA educational strategies and outcomes.

The fitness industry is so much larger than a single model of exercise programming. It's about making people strong, making people enduring, making people mobile. To truly be an expert, one needs to have more than just classical periodization in the professional toolbox. This is true for the individual coach and for the professional organization.

CrossFit coaches and CrossFit Inc. understand this. Just look at the formal specialty certification system and the system of continuing education. This is where the diverse elements of fitness theory and methodology are delivered to coaches for integration into the CrossFit model of training and in support of practice in other fitness arenas such as weightlifting, powerlifting, strongman, running, etc.

This consideration of classical programming points out a defining difference between the NSCA and CrossFit: The NSCA attempts to apply one single approach and model of programming to all ends, including improved fitness, sport performance, rehabilitation, health, etc. The association is attempting to use one thing, one tool, to accomplish all these goals, but sound craftsmen simply won't use a hammer when a screwdriver is called for.

This approach stands in stark contrast to CrossFit's educational system, which draws on a broad spectrum of programmatic, theoretical and practical resources to create fitness, a concept it has clearly defined.

CrossFit trainers strive to use everything relevant to accomplish one important and well-defined goal—improving fitness—and having a broad set of tools at their disposal affords them the ability to select the optimal approach for each client in reflection of that client's goals.



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Lon Kilgore graduated from Lincoln University with a B.Sc. in biology and M.Sc. in kinesiology from Kansas State University, and he earned a Ph.D. from the Department of Anatomy and Physiology at Kansas State University's College of Veterinary Medicine. He has competed in weightlifting to the national level since 1972 and coached his first athletes from a garage gym to national-championship event medals in 1974. He has also competed in powerlifting, the first CrossFit Total event, wrestling and rowing. He has worked in the trenches, as a coach or scientific consultant, with athletes from rank novices to professionals and the Olympic elite, and as a collegiate strength coach. He was co-developer of the Basic Barbell Training and Exercise Science specialty seminars for CrossFit (mid-2000s). He was a certifying instructor for USA Weightlifting for more than a decade and a frequent lecturer at events at the U.S. Olympic Training Center. He is a decorated military veteran (sergeant, U.S. Army). His illustration, authorship and co-authorship efforts include the best-selling books "Starting Strength" (first and second editions) and "Practical Programming for Strength Training" (first and second editions), recent releases "Anatomy Without a Scalpel" and "FIT," magazine columns, textbook chapters, and numerous research-journal publications. His professional goal is to provide the best quality, most practical, most accessible and highly affordable educational experiences to fitness professionals through his university work and through his *AnatomyWOD*, *PhysiologyWOD* and *YogaWOD* courses. His students have gone on to become highly notable figures in weightlifting, powerlifting, cycling, fitness and academia.

THE CrossFit JOURNAL

Learning for Life

The secret to becoming an expert is always behaving like a student.

By Emily Beers

April 2015



John Broz questions himself all the time.

Although Broz has been involved in the sport of Olympic weightlifting for 36 years—he started when he was just 10 years old—he sometimes doesn't feel as qualified as he'd like.

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As a young athlete, Broz was mentored by John Schubert, the man who coached Charles Vinci, the last American to win a gold medal in weightlifting at the Olympic Games. Schubert's pupil won gold in both 1956 and 1960 as a bantamweight. Later in his career, Broz lived and trained with Antonio Krastev, the two-time world weightlifting champion who registered the heaviest snatch in an International Weightlifting Federation competition, though the 216-kg record is no longer considered official.

Broz, who owns and coaches at Average Broz's Gymnasium in Las Vegas, Nevada, has been educated by the best of the best in the world, and today he's a world-renowned coach himself. He's coached athletes who have gone on to qualify for national teams, as well as junior and senior world and Pan-American teams. He's an expert in his field—yet he doesn't always feel like an expert because he knows there's always so much more to learn.

"Sometimes I feel under-qualified, even with 36 years of experience under my belt," Broz said. "I never stop learning."

He believes the best coaches are always learning more about their craft.

"A lot of (being a great coach) is about remaining open-minded and accepting new beliefs and opinions, even if it's totally against your beliefs," Broz said. "Critically think, and then you'll find yourself in a different place."

With regard to weightlifting, Broz believes it's more important than ever for coaches to think critically because all resources are not created equal.

"There's more disinformation available now than ever before. I don't think people want to be bad coaches or seek out bad information, but they're listening to the social-media street-cred guy, and they don't know the difference," Broz said.

"Some people are just really good at marketing themselves," he added.

But marketing doesn't make someone an expert. Broz said it's difficult to know what information is good information, and he always encourages his athletes to constantly ask questions.

"The people who question why things are the way they are, they are the people who become excellent coaches," he said.



Emily Beers / CrossFit Journal

Even when you think you know everything, there's always more to learn.

Level 3: Continuing Education

Nicole Carroll is CrossFit Inc.'s Director of Certification and Co-Director of Training.

It goes without saying that Carroll expects CrossFit coaches to constantly seek new knowledge and continually stay up to date in their coaching. Continuing education is partly about becoming the best technical coach you can be, but to Carroll there's something even bigger going on than just the pursuit of technical mastery.

"The goal of continued education is staying relevant in your field and self-improvement. To not seek it out implies you think you know everything or you don't care," Carroll said.

For Carroll, certifications, certificates, diplomas and degrees represent an element of basic competency, and continuing education builds upon that foundation. CrossFit's credentialing program follows this model.

The Level 1 Certificate Course is “the natural first step for a CrossFit coach,” Carroll said.

Although the Level 1 lays a solid foundation for becoming a CrossFit coach, it was never meant to be the end of the coaching journey.

“The goal of continued education is staying relevant in your field and self-improvement.”

—Nicole Carroll

“At the close of the Level 1, we say, ‘This is only the beginning. When you step into the world as a coach, it becomes very evident how much you don’t know,’” Carroll said.

This is part of the reason CrossFit implemented a 55-question written multiple-choice test in 2010.

“We implemented a test to ensure beginning trainers have a basic level of competency in order to go out and learn responsibly,” Carroll said. “Then, if a person does not pursue higher-level credentials, we require them, at a minimum, to come back to the Level 1 every five years.

“Sometimes we get trainers who have been training for years and don’t want to come back to the Level 1. But as an organization, we feel responsible for those who call themselves CrossFit trainers. We want to ensure that they retain a baseline level of competency, knowledge and currency regarding the foundational CrossFit material.”

At minimum, Level 1 trainers should be able to pass the foundational test, she explained.

After the Level 1 Certificate Course, many trainers go on to take the Level 2 Certificate Course (CF-L2). Carroll explained the purpose of this next step: “Trainers get to dig deeper into the practical application of CrossFit’s methodology. They also spend 70 percent of the two days getting individualized feedback on their coaching from some of the best coaches in the CrossFit community. They can take that feedback and use it for further self-improvement.”



Alicia Anthony/CrossFit Journal

Nicole Carroll says the Level 1 Certificate Course is only the beginning of the educational journey for CrossFit trainers.

But beyond the Level 1 and Level 2 certificate courses, Carroll is most excited about CrossFit's newest credentials, the Certified CrossFit Trainer (CCFT/CF-L3) and the Certified CrossFit Coach (CF-L4). The CF-L3 is computer based, and the CF-L4 is a performance test in which candidates are evaluated live as they instruct CrossFit movements.

What makes the CF-L3 credential unique is its continuing-education requirement. After passing the test, those who earn the CF-L3 credential must complete 50 hours of continuing-education units (CEUs) and 900 coaching hours over the course of three years in order to retain it.

"As far as I know, the CCFT is the only fitness certification available that requires a minimum amount of actual coaching hours to maintain," Carroll said.

CEUs can be earned through a broad menu of courses and individualized options. It's up to the coach to decide which topics to focus on. If a course—be it an anatomy seminar, a weightlifting course or even business training—meets CrossFit's standards, it will be added to the official list of CEUs. The CF-L3 is less than a year old, and Carroll expects the list of [Continuing Education Approved Providers](#) to grow quickly, giving more options to those who want to improve their skills. People can also petition CrossFit for CEUs from courses or activities not listed.

"The goal is not to limit people but to encourage them to embrace learning in all areas related to their profession," Carroll said.

Carroll is excited to see how the CF-L3 will contribute to the growth of the professional CrossFit coach.

"We really want to drive more and more trainers through the highest levels of development. It's only good for the community. People don't realize how (many educational opportunities are) available," she said.

Implementing Continuing Education in Your Box

Chandler Walker is the owner of CrossFit StoneAgeFuel in Reno, Nevada, an affiliate he opened just over a year ago. Before he was a gym owner, he built his StoneAgeFuel brand via an educational blog about nutrition. As his blog grew, Walker eventually started to host seminars about nutrition. Before he knew it, the brand he had built turned it into a gym.

With a college background in biochemistry, Walker considers education to be close to his heart, and he's always looking for new ways to educate himself and his coaches.

"If you don't continue your education and continue learning, you're not going to get exposed to new ideas to add onto what you already know and are learning. And if you're at a point where you think you know everything, you've failed as a coach," Walker said.

While it's impossible to become an expert in every field, Walker considers it important to learn as much as possible about various fields of fitness, and being part of the CrossFit Endurance and CrossFit Weightlifting seminar staffs helps him build specific toolsets. He said coaching at CrossFit seminars is as much about his own education as it is about educating others.

"I get to see the way different people develop cues and styles, and I get an idea for how different body types move," Walker said.



Chandler Walker

As an affiliate owner, Chandler Walker expects all of his coaches to continue their education beyond the Level 1 course.



Shaun Cleary/CrossFit Journal

When an experienced coach evaluates and advises another, both parties often learn a great deal and improve their skills.

Walker expects his two coaches and three intern coaches to continue their education after they complete the Level 1 Certificate Course. He also encourages them to take the CrossFit Weightlifting and the CrossFit Gymnastics trainer courses, but he's open to other suggestions as well.

"It doesn't even have to be a CrossFit seminar. It could be the USA Weightlifting (certification)—anything that will improve them as a coach," Walker said.

He recognizes additional courses can be expensive, but he sees them as investments. When one of his coaches takes a seminar and gains new knowledge, the coach is encouraged to use this knowledge to launch a new specialty program at CrossFit StoneAgeFuel, such as a barbell club or a competitor's program. These programs often generate new revenue streams for Walker's coaches and his gym.

Walker also offers cost-free nutritional education to his coaches: Each goes through the nutrition series Walker developed via his StoneAgeFuel seminars. In the Fluff to Tuff Healthy Eating Program, coaches learn about the

science behind diet, weight loss, athletic performance and autoimmune diseases.

"If you're at a point where you think you know everything, you've failed as a coach."

—Chandler Walker

"It basically gives them a basic course in metabolism and biochemistry so they can learn without having to pay for a university course," Walker said.

According to Walker, education doesn't always have to happen during a formal course or seminar, nor does it have to be costly to be effective. In fact, Walker believes some of the most important education takes place on the floor at

the gym, and he uses test days as part of the process. His written evaluations are broad and cover things as simple as starting the class on time, as well as warm-up procedures, technical knowledge, communication skills and so on. He also provides specific notes to address individual strengths, weaknesses and areas for improvement.

Similar to Walker, Stephane Rochet believes you can continue your education without spending hundreds or thousands of dollars.

“The main way I like to gain knowledge that I can apply is by going out and visiting another coach,” said Rochet, who has been part of the Level 1 Seminar Staff for eight years and also serves as a CrossFit Weightlifting coach. “I’ll go see different affiliates. I’ll go and watch other people train. You can always learn something that you can implement.”

Rochet added: “Everyone in their area has people who are very knowledgeable, who are kind of experts in their field. So seek those people out. Whether it’s an author or a coach. You’d be amazed how open people are to helping

others. School is important, and it gives you a foundation, but most of the important stuff you need to know, and to develop your philosophy, primarily comes from learning from other people.”

Rochet explained learning directly from other coaches has been invaluable to his own development. One of the first jobs he had as a strength-and-conditioning coach was at the University of California, Los Angeles (UCLA), where he worked with and learned from longtime CrossFit athlete and coach Josh Everett.

After working at UCLA, Rochet became the strength coach at the University of San Diego for seven years. He worked with 500 student-athletes on 17 different teams, and he had several assistants and volunteer coaches working under him.

Although Rochet always put pressure on the university to make room in the budget for formal education for his coaches, he found his own inexpensive ways to help his coaches learn. For example, a simple reading list can be a very effective way to encourage continuing education.



Alicia Anthony/CrossFit Journal

While classes and seminars are great, Stephane Rochet (right) says simple reading lists can assist coaches seeking self-directed education.



Angel Orozco

Angel Orozco has trainers intern before becoming full-fledged coaches at Telegraph CrossFit.

One book Rochet always encouraged his coaches to read was “Science and Practice of Strength Training” by Vladimir Zatsiorsky. He also recommended reading about nutrition, specifically books by Dr. Loren Cordain, including “The Paleo Diet for Athletes.”

On top of keeping coaches reading, attending seminars and certifications, and learning from experts, many affiliates implement in-house internship programs based on continuing education.

Angel Orozco runs an internship program at Telegraph CrossFit in San Francisco, California. His program generally takes five to eight months to complete..

The Level 1 Certificate Course is the first step for any new intern. As many gym owners do, Orozco pays 50 percent of the fee for any relevant course his coaches take, as he knows investing in education will only help his business. When one of his coaches takes a specialty course, such as the CrossFit Weightlifting or Powerlifting courses, Orozco gives him or her plenty of opportunity to share the new knowledge.

“I leave a lot of class time open to coaches’ discretion, as long as it fits within the hour,” Orozco said. This free time

in class—usually at the beginning and end—allows his coaches to put the new drills and skills they’ve learned to immediate use.

On top of this, Saturday and Sunday workouts are completely up to the coach to program.

“So they can create what they want that day. If they’ve just done a powerlifting cert and they want to teach new things to others, they have the green light,” he said.

Orozco also relies on Google Docs to educate his coaches, especially his intern coaches. All the coaches can view and collaborate on the online documents, making them a great way to share knowledge, provide feedback to interns about their coaching performances and generate discussion. It’s also a great way for intern coaches to ask questions of senior coaches, such as why a certain workout was programmed or why certain modifications were used. And Orozco can open the document at any time to see what kind of information and feedback other coaches are sharing with each other.

Choose Your Own Adventure

Education can be found in many forms, be it a classroom, a book, a seminar or course, or a personal session with an expert coach like Broz.

It doesn’t necessarily matter how you educate yourself. The important thing is to constantly seek out good information and good coaches and mentors, to ask lots of questions, to think critically, and to stay up-to-date with what’s new.

For Carroll, the ultimate goal of continuing education is simple: “(It’s about) staying relevant in your field in order to be the best you can be and get the best results for the people who place their trust in you as a coach.”



About the Author

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

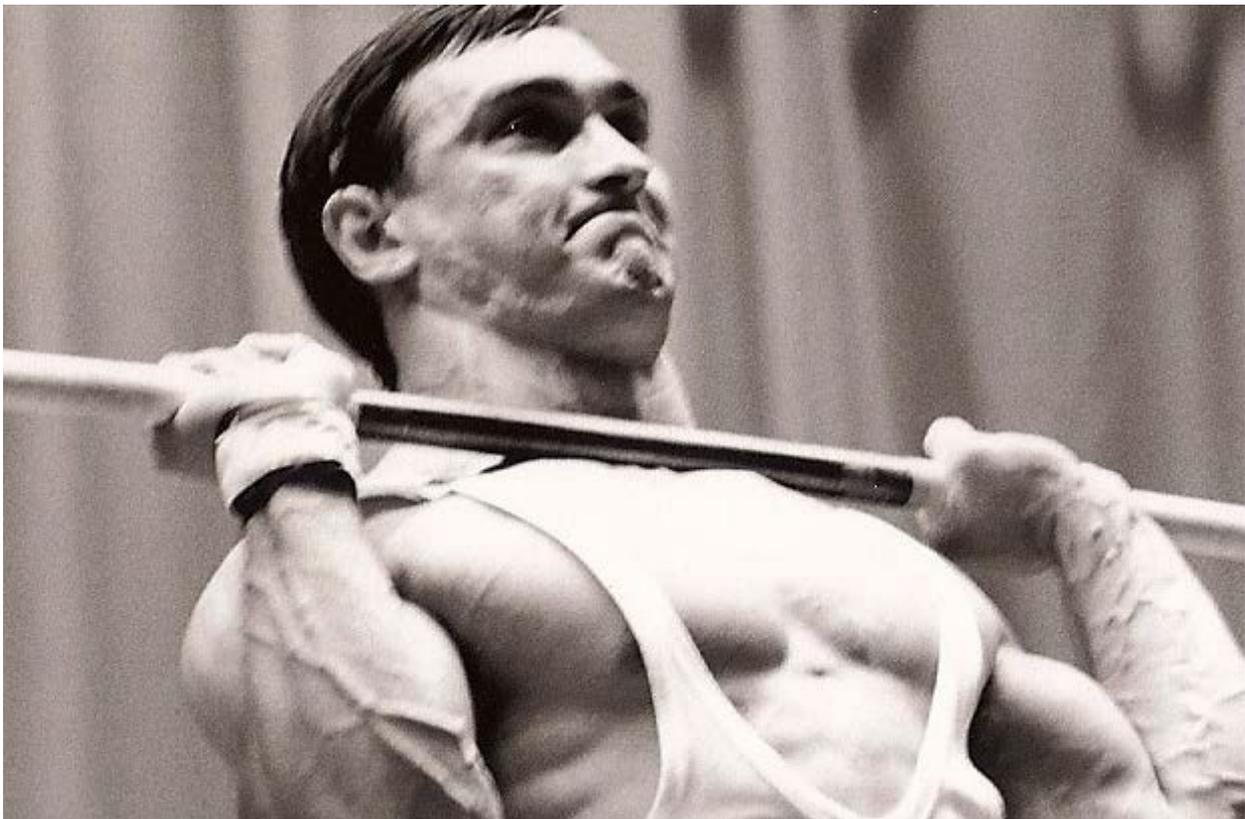
THE CrossFit JOURNAL

Bill Starr, 1938-2015

Longtime CrossFit Journal contributor and strength legend Bill Starr passes on at 77.

By Mike Warkentin

April 2015

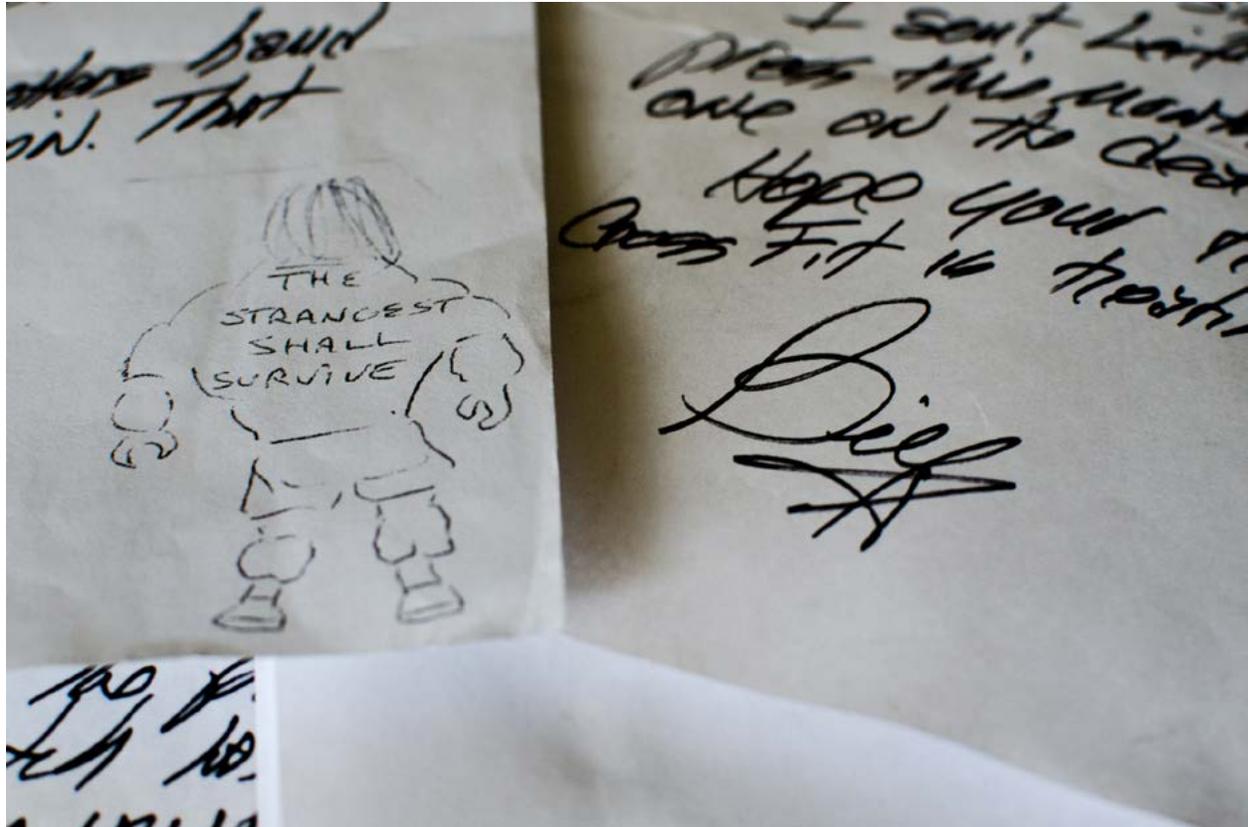


Jody Forster

To call him the last of a breed would be accurate.

Bill Starr was indeed that, and CrossFit Inc. was saddened to learn of his death on April 7 in Maryland. He was 77.

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Mike Warkentin/CrossFit Journal

Farewell, Bill. The strongest, and the strangest, survive in memory.

Starr first contributed to the CrossFit Journal with “Overhead Is Rising” in November 2008. It was introduced as follows:

“This article is both an instructional piece on overhead lifting, as well as a history of the unfortunate demise of overhead lifting in most strength and conditioning programs.”

I was lucky enough to edit Starr from April 2009 to the present, and those lines define his body of work to me. Starr was a technical resource to be sure, but he was more than that: He was a part of the history of fitness in North America.

I never met Starr, and I succeeded in speaking to him on the phone but once in six years. I had been told Starr was a private man who corresponded almost exclusively by fax or mail, but I had also been told I might catch him on the phone if I was lucky enough to call at exactly the right time, when he had switched off his fax machine for the night.

I tried several times and got lucky once in 2009 or 2010. Starr actually laughed at me when he answered the phone. He said something like, “Figured out the system, did you?” before we talked for a bit about upcoming articles.

I never spoke to him again after that call, and while he had my number, he never rang it. Our correspondence was archaic and sporadic, but always appreciated on my end. I’d fax him letters on a machine that wouldn’t receive, and he’d receive on a machine he said wouldn’t send. So he’d write—letters, not email. All along, CrossFit Journal readers would devour his articles and ask questions of an author who wasn’t online to reply.

Starr’s letters were always a welcome sight in the mailbox. These were actual letters—handwritten or typed, with the envelopes taped shut. Sometimes he’d include a Far Side cartoon. The stationery was either just an unlined piece of paper or a sheet with muscled cartoon characters in the upper-left and bottom-right corners. One wore a shirt that read “Defying Gravy,” and the other read “The Strangest Shall

Survive”—a play on the titles of his books, “Defying Gravity” and “The Strongest Shall Survive: Strength Training for Football.” He signed each letter with “Bill” and a simple star.

By mail and fax, we talked over the years, throwing article ideas back and forth. I was as eager a reader as CrossFit Journal subscribers and always asked Starr technique and training questions that inevitably led to Journal articles. Starr, whose sense of humor was never lacking, always filled the letters with anecdotes and tales from decades spent in the iron game. It seemed he knew just about everyone who had ever snatched more than 250 lb., and he had many, many great stories, some fit for print and some—the funniest, of course—best left in handwritten letters filed away in a cabinet.

We’d correspond, and Starr would type and then mail his manuscripts to the CrossFit Media office in Scotts Valley, California, where they were typed up for editing. The process was slow, but it was always worth it to me, and they were welcome emails that announced a new article had arrived in an envelope from Maryland.

We talked a lot about photos to accompany the text, and I was always pleased when Starr received printed copies of the articles and approved of the images. The form mattered to Starr, and he’d always review our images and edits. In one case, I mentioned the challenges of making heavy lifts look good, and Starr shared a bit of advice I won’t ever forget: “You should have just had spotters hand you the 485 at the finish position. (That’s) what most publications do.”

After several years of working with Starr, I had the idea to write about him myself. He was a true character and a fountain of knowledge, so I asked him if I might visit and interview him. His response was simple:

“I’m not interested in doing an interview. They take up time & really serve no function, except to boost egos & the Tao says to avoid bragging.”

And so I scratched that idea and instead tried to get as much history as I could from Starr. Sure, I wanted technical info, but more than that I wanted to know about the history of strength training. What was it like when bodybuilders and Olympic lifters were the same people? How did people train before bumper plates were common? What happened when steroids appeared and then later became illegal? How did the black-iron crew feel when the barbells and platforms were banished and shiny machines put in their place?

That last question was answered in the recent article “[Rise of the Machines](#).” It’s one of my favorites, and it documents that dark era between the early period of North American Olympic lifting and powerlifting and the “new Renaissance” brought on by CrossFit.

After growing up in machine-filled gyms in which the only barbell was always at the bench-press station, I had a lot of respect for a guy who very clearly did his own thing regardless of how the magazines defined strength training. Starr knew how to make people strong, and he did. His way. For many, many years. Internet be damned, machines be damned, complicated systems be damned.

His character and the elegance of his prescriptions and training advice made Starr a natural fit for the CrossFit Journal. We’re proud that his voice was a big part of the publication over the last years, and we’ll soon publish the final articles he wrote. And then we’ll do some heavy squats in his honor.

In closing, I’ll share one of my favorite lines from Starr, written after I told him a few of his training recommendations had me walking funny for days.

“Glad you got sore. Feels great doesn’t it?”

Indeed it does. Every time.



About the Author

Mike Warkentin is the Managing Editor of the CrossFit Journal and the founder of [CrossFit 204](#).

THE CrossFit JOURNAL

Hammer Time

The CrossFit Games have twice exposed athletes who didn't know how to swing a sledgehammer. Moe Kelsey and Dan Hollingsworth offer tips for mastering this basic functional movement.

By Hilary Achauer

April 2015



It was a "blue-collar test."

The fourth event at the 2009 CrossFit Games started with a 500-m row. Once the row was completed, athletes had to drive a 4-foot stake into the ground with a sledgehammer until no more than 6 inches remained above the ground. Then it was back to the rower for another 500 m.

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Reactions were mixed when athletes heard the event details.

"This event could end my day," Josh Everett said. "My hand-eye coordination is very poor."

Moe Kelsey, on the other hand, was thrilled. A relatively new CrossFit athlete at the time, Kelsey was a firefighter and had worked in concrete construction.

"I would pound steel stakes into the ground like four to five hours in a day," Kelsey said. "It was in my wheelhouse. There couldn't be anything really better."

Many competitors in 2009 struggled to pound the stake into the ground. They were unsure how to hold the sledgehammer and weren't able to accurately hit the stake with power.

Kelsey knew exactly what to do. He finished the event in 4:46 and took third place, and he went on to finish third overall. As he predicted, Everett did not do well in the event. He took 57th place.



Matt Nemann

It isn't surprising that many great athletes possess impressive skill when swinging a stick, club, hammer, bat or racket.

Farm kids, firefighters and people with construction experience thrived in this event. Other competitors bloodied their hands with inaccurate swings, and one turned the sledgehammer upside down and used it like a potato masher. Poor accuracy resulted in so many snapped sledgehammers in Heat 1 that CrossFit Games staff members obtained cash from the beer garden to buy more equipment from local hardware stores.

Swinging a sledgehammer or other implement is useful in sport, at home or at work. In the box, hammer strikes can be used to develop strength, explosive power and accuracy.

"I think that if you can't with just minimal proficiency wield a bat, strike something with a hammer, defend yourself with a club or work a machete to some advantage, it speaks to a deficiency in your fitness," said CrossFit Founder and CEO Greg Glassman, who had suggested the stake-drive event for the Games after a tough experience pounding a grounding rod into the earth.

Here, Kelsey and trainer Dan Hollingsworth take apart the sledgehammer swing, offering tips for more efficient, effective movement.

Start Small

Kelsey has been doing CrossFit since 2008. He followed up his 2009 podium finish with 14th at the 2010 Games. Today, Kelsey is a firefighter and a trainer at Mt. Baker CrossFit in Burlington, Washington. In addition to construction work, Kelsey chopped wood when he was growing up and is accustomed to swinging an axe as a firefighter.

His years of experience meant Kelsey knew exactly how to approach the sledgehammer challenge at the 2009 Games. Many athletes started with wide, over-the-head swings, but Kelsey choked up on the handle, putting his right hand next to the head and his left hand on the stake itself.

"(The stake) was so long, you needed to get it established into the ground first," Kelsey said. "I knew you couldn't start swinging with any force ... I made sure (the stake) was nice and vertical and pounded with little, short strokes until it was really purchased in the ground."

Those who swung the hammer too aggressively ended up with the stake tilted sideways.

“You can’t be efficient if (the stake) is not vertical,” Kelsey said. “If you are taking big, huge swings and are not accurate, you are just wasting energy. If you don’t have the accuracy, better to take smaller, more accurate blows, versus some big, huge, powerful swing and then you miss. Some people hit their hands. Or they hit the handle.”

The key to accuracy, Kelsey said, is keeping your eye on the target during the entire swing.

Big Swings

Once the stake is well established, it’s time to really start swinging. If you’re hammering a larger target, such as a tire or concrete, you can skip the small swings and start off with full-body swings.

First, establish your stance. Some people prefer to stand facing the target with their feet shoulder width apart. A diagonal

“If you can’t be accurate, take smaller swings.”

—Moe Kelsey

stance, with one foot behind the other, is the best option if you’re a beginner or if you’re using a heavy sledgehammer.

Try out both stances to see which one feels most comfortable for you, and go with the stance that gives you the best accuracy. Start swinging slowly, and increase power as your accuracy improves. Nobody wants to take a 16-lb. sledgehammer on the toes, so stay focused and keep your eye on the target. As with firearms, always consider where a missed shot might end up.

Kelsey prefers a diagonal stance similar to that seen in a split jerk, though the feet are closer together. He’s right-handed, so he stands with his right foot back and his left foot forward.

Once the stake is solidly in the ground, take your hand off the stake and put both hands on the hammer. Kelsey recommends putting your dominant hand up by the head and your non-dominant hand midway down the handle.



In this shot from the 2009 CrossFit Games, Kelsey has placed his dominant hand at the bottom of the shaft. In general, the non-dominant hand would be the lower of the two.

Starting with the handle between your waist and mid-thigh, make an arc—almost like a J—with the hammer. As the hammer comes down and the head nears the target, your dominant hand slides back to meet your other hand.

The bottom hand, your non-dominant hand, should hold the handle tightly, almost in a death grip. Loosen up your dominant hand so it can easily slide down the shaft.

“As (the stake) goes further and further down, you can start moving the (non-dominant) hand further and further down the handle,” Kelsey said. When the stake is at chest level, it’s difficult to execute a full swing, but once the stake reaches about waist level, that’s when it’s time for the big swings.

Accuracy, however, trumps all.

“If you can’t be accurate, take smaller swings,” Kelsey said.



Anna Talhelm

Swinging a sledgehammer is a core-to-extremity movement that relies on hip flexion, which is seen less often than hip extension in CrossFit gyms.

Body Position and Flexion

During a sledgehammer swing, the body moves much as it does in a ball slam. The core-to-extremity movement starts with the body upright. The sledge comes overhead, and as it swings down, the chest comes toward the target, just like at the end of a ball slam.

Hollingsworth owns Kitsap CrossFit in Poulsbo, Washington. He's been a member of CrossFit's Level 1 Seminar Staff for four years, and he's also on the CrossFit Kids and CrossFit Endurance staffs. He holds a master's degree in physical therapy.

Hollingsworth said swinging a sledgehammer is a flexion movement—as opposed to shoveling snow, which is an extension movement.

"The sledge (is) overhead, then you're pulling down to a really aggressive hip flexion to create power. The corollary in the gym would be GHD sit-ups, where we're doing an aggressive hip flexion," Hollingsworth said. He said two other exercises that use hip flexion are toes-to-bars or, as Kelsey said, ball slams.

"But our library of movements that train hip flexion are much smaller than hip extension," Hollingsworth said.

When CrossFit athletes swing a sledgehammer, it's usually aimed at a tire. This is an effective, full-body movement, but indiscriminately hitting a tire takes away the accuracy component. Kelsey has a solution for this.

"If you have a spot that you are aiming for, let's say on the sidewall there's a letter, or there's one small target you can aim for, try to hit that one specific spot rather than just blindly hitting the whole tire," Kelsey said.

Swing Away

The sledgehammer is a useful tool—in fitness, sport, construction, do-it-yourself jobs around the house and even at the state fair. Whatever your purpose for swinging a sledge, keep these tips in mind to improve your effectiveness and accuracy.

The sledgehammer has appeared at the CrossFit Games twice—in 2009 and in the Double Banger in 2012.

Perhaps it will appear in your next workout.



About the Author

Hilary Achauer is a freelance writer and editor specializing in health and wellness content. In addition to writing articles, online content, blogs and newsletters, Hilary writes for the CrossFit Journal. To contact her, visit hilaryachauer.com.

HYDRATING THE ELITE

BY EMILY BEERS

Olympic gold medalist Simon Whitfield reveals how elite triathletes figured out widely held hydration guidelines are wrong.





In endurance events, top athletes often use aid stations to cool themselves off rather than to stay hydrated.

When Simon Whitfield competed in the 2000 Sydney Olympic Games—the first to include the sport of triathlon—the information he had been fed about hydration was confusing at best.

“Lots of things were haphazard. Lots of different information contradicted each other,” Whitfield said.

When Whitfield first got involved in triathlons as a teenager in the early 1990s—in a time he refers to as “the infancy of the sport”—he said North American athletes’ beliefs about hydration were just plain wrong.

“I came in in a generation where we had no idea what we were doing,” said Whitfield, now 39. “We were told to hydrate, so we’d hydrate like crazy people. ... You’d see people everywhere guzzling giant 2-liter bottles before a race.”

In the book “Waterlogged: The Serious Problem of Overhydration in Endurance Sports,” Dr. Tim Noakes examines the rise of the commonly given advice to drink as much and as often as possible before engaging in endurance exercise—advice many recreational triathletes take even today.

The philosophy that suggests drinking more is always better started to take hold in the 1970s, Noakes explained in his book. By 1996, the American College of Sports Medicine (ACSM) was recommending people “Consume the maximal amount that can be tolerated” in the [“American College of Sports Medicine Position Stand. Exercise and Fluid Replacement.”](#)

Similarly, in 2002, magazines such as Runner’s World—North America’s most widely read running publication—were publishing advertisements that instructed athletes to, “Drink early and often,” “Always drink sports drinks on long runs” and “Don’t wait until you feel thirsty.” Institutions such as the Gatorade Sports Science Institute (GSSI) often paid for these advertisements.

Ads—as well as articles written by mainstream media outlets such as [The New York Times](#)—have played a role in shaping people’s ideas about how much they should drink during exercise, said Dr. Mitchell Rosner, a nephrologist and professor of medicine at the University of Virginia. The ads often seem like they’re based on science; Rosner said they’re not.

“Bottled-water companies, too, are pretty vocal at pushing their product,” he noted. “The mainstream advertising tells you you need to avoid dehydration, and if you wait until you’re thirsty, it’s too late.” This is a lie, Rosner explained. Instead of blindly fearing dehydration, athletes should listen to their body’s natural thirst mechanism.

“Use your thirst to guide behavior. Don’t just drink because you’re drinking to prevent a condition that may or may not occur, and understand the consequences of overdrinking,” Rosner warned.

Worst-case scenario: Overdrinking while exercising can cause exercise-associated hyponatremia (EAH), a condition that leaves an athlete with a dangerously low sodium concentration in the blood. The effect can be life threatening, as explained in the CrossFit Journal article [“Water Wise.”](#)

**“USE YOUR THIRST TO GUIDE BEHAVIOR.
DON’T JUST DRINK BECAUSE YOU’RE DRINKING
TO PREVENT A CONDITION THAT MAY
OR MAY NOT OCCUR, AND UNDERSTAND
THE CONSEQUENCES OF OVERDRINKING.”**

—DR. MITCHELL ROSNER

Dr. Tamara Hew-Butler—an exercise physiologist who teaches exercise science at Oakland University in Rochester, Michigan—has dedicated the last 15 years to studying EAH. She explained that normal blood-sodium levels fall between the range of 135 and 145 millimoles per liter (mmol/L). Drinking too much dilutes these levels.

“When there isn’t (enough) sodium in the blood, water flows in (to the cells) and you can get swelling,” Hew-Butler explained.

When this swelling occurs in the brain and causes increased pressure in the skull, it’s called hyponatremic encephalopathy and it can be deadly.

In the 2002 Boston Marathon alone, 13 percent of 488 runners studied were found to be hyponatremic, while other studies have found some endurance events to report percentages as high as 29 percent, according to Rosner and Justin Kirven’s 2006 article [“Exercise-Associated Hyponatremia,”](#) published in the Clinical Journal of the American Society of Nephrology.

In “Waterlogged,” Noakes documented 12 deaths from EAH or exercise-associated hyponatremic encephalopathy (EAHE) between 1981 and 2009. And just last year, two otherwise healthy 17-year-old high-school football players [died from EAHE after drinking too much water and Gatorade.](#)

Even though EAH was first described in 1981 in Durban, South Africa, information about it still hasn't sunk in with the masses of endurance athletes today, both Hew-Butler and Rosner said.

Whitfield, though, explained that the elite-triathlon community rejects the ACSM's drinking advice, which was updated in 2007 but still doesn't solve the problem. Instead, elite triathletes follow hydration guidelines that are in line with what Hew-Butler, Noakes and Rosner advise: Drink when you're thirsty.

"From my generation, we had to figure out by trial and error (to learn that) chugging water before a race doesn't work," Whitfield said.

The more he drank, "the more I cramped," he said. "(My) body just wasn't used to that much fluid."

He added, laughing: "That idea that if you wait until you're thirsty, then it's too late, you're already dehydrated—that's crazy."

A Personal Hydration Plan

In 2011—just one year before his fourth and final Olympic Games, in London—Whitfield started working with Trent Stellingwerff.

Stellingwerff, of the Canadian Sport Institute, studied at Cornell University in Ithaca, New York, before earning his doctorate in exercise physiology from Guelph University in Guelph, Ontario. In addition to working with triathletes, he also has experience with rowers and track-and-field athletes.

Leading up the 2012 Olympic Games, Stellingwerff spent time with Whitfield doing what he described as "nutrition interventions."

This meant "doing some things outside the box," Stellingwerff explained.

These experiments involved having Whitfield complete workouts with nothing more than caffeine in his system, for example.

"Or in another session, we would withhold carbohydrates and then go for a cycle. Other times, he'd take lots of carbohydrates to see how his body would react," Stellingwerff said.

The idea was to experiment to discover what helped Whitfield perform best. Part of this trial and error was figuring out a hydration plan.

When helping athletes with hydration, Stellingwerff tests for two major indicators: salt loss and sweat rate. Some athletes sweat more—or lose more salt—than others. Knowing how much salt



Exercise physiologist Trent Stellingwerff, Ph.D., helped Simon Whitfield prepare for the 2012 Olympics.

and water each athlete loses while training or racing provides valuable data to help determine his hydration plan, he said.

To test for salt loss, athletes wear one or multiple patches while training. The patches collect sweat, which then gets spun down in a centrifuge to be analyzed by a [Sweat-Chek Analyzer](#). The Sweat-Chek Analyzer then measures the sodium and salt content of the sweat, Stellingwerff explained.

While Stellingwerff said this test provides an incredibly accurate measurement of salt loss, there's a less sophisticated way of essentially doing the same thing.

"The poor-man's sodium test is to go out on a hot day wearing a black T-shirt, and if you have salt crusts all over the T-shirt, then you're a heavy sweater," Stellingwerff said.

Stellingwerff has found that some people lose as much as 6-8 g of salt during a training session or race. The [American Heart Association](#) recommends an athlete consume up to 2.4 g of sodium a day, so these athletes would be losing three or four days' worth of salt, according to those guidelines.



After winning a gold medal at the 2000 Sydney Olympics, triathlete Simon Whitfield won silver at the 2008 Beijing Olympics.

This means an athlete would need to drink up to 24 L of a typical sports drink to replenish their salt, Stellingwerff explained.

"It's impossible," he said.

Rosner reiterated a similar point.

"Sodium concentration (in Gatorade) is not high. The salt in Gatorade isn't in high enough concentrations to prevent hyponatremia," he said.

Instead, Rosner added, drinking Gatorade is equivalent to drinking sugar water.

In fact, the sodium in Gatorade is "irrelevant" in maintaining blood-sodium levels, hydration expert Sandra Fowkes Godek, Ph.D., said in the [CrossFit Journal](#) article "[Confronting the Drinking Problem](#)." That means overdrinking Gatorade or other sports beverages is just as dangerous as consuming too much water.

Rather than guzzling Gatorade, Stellingwerff recommended his athletes be liberal with salting their food.

"THAT IDEA THAT IF YOU WAIT UNTIL YOU'RE THIRSTY, THEN IT'S TOO LATE, YOU'RE ALREADY DEHYDRATED—THAT'S CRAZY."

—SIMON WHITFIELD

Some endurance athletes add salt and electrolytes to their water to replenish their sodium, but Rosner was adamant that scientists aren't sure whether salt supplementation is useful.

"It's controversial. It's not completely clear whether salt supplementation improves this condition," he said.

The second most important piece of the puzzle for determining a person's hydration needs, Stellingwerff said, is to determine his or her sweat rate. This is done by measuring the athlete's body weight before and after a race: 1 kg of lost body weight while training or racing is equal to 1 L of sweat.



It's common for athletes to lose weight during long events such as Ironman triathlons (left), according to Dr. Tamara Hew-Butler (right). If athletes do not, they're probably overdrinking.

"Anyone can do this," Stellingwerff said. "If you're coming out (of a training session or a race) weighing more or the same, then you're drinking too much."

Hew-Butler also said losing weight during a long endurance session is expected.

"You should always lose a little bit of weight," she said.

If not, you're probably overdrinking, she added.

Both Hew-Butler and Stellingwerff said an athlete should expect to lose between 2 and 4 percent of his body weight during an endurance event.

"That is normal," Stellingwerff added. "I worked with a race walker who lost 6 percent of his body weight. ... It's normal to get dehydrated during a race."

An athlete is considered to be dehydrated if his blood-sodium levels are above 145 mmol/L. Only a blood test will reveal the exact dehydration level of an athlete, but the body's natural thirst mechanism is nearly foolproof, Hew-Butler said.

"That's the best fluid guideline that you can have. Your body has sensors that sense blood sodium in your brain and your heart," she said.

Even when thirst does kick in during training or a race, an athlete doesn't need to panic, she said.

"When you start to feel thirsty, you're still in the normal range of blood sodium," she said.

When dehydration becomes dangerous, Hew-Butler said the athlete would be forced to seek out water.

"(When you're dangerously dehydrated), your body dominates every thought you have, so when you get to that point you'd stop and have to drink something. You would actually stop. You would stop performing and look for water," she said.

Getting to that point is unlikely today, Hew-Butler added.

"In today's modern world, there's always water. There's so much water that people ... don't actually know what thirst is," she said.

The challenge in getting hydration just right comes because sweat rates vary based on outside temperature and workout intensity. To account for this, Stellingwerff tests his athletes at specific temperatures and intensities defined by an athlete's heart rate. A heart-rate monitor is used to measure intensity, while his athletes train in a heat chamber that allows them to

set temperatures and humidities to mimic what they might see in an upcoming race.

Heat acclimation is another variable when it comes to sweat, Stellingwerff explained.

"When you first get into heat you feel horrible, but you can adapt. Within five to 10 days you have an increase of blood volume when you train in the heat, and that allows you within two weeks or so to get an increase in sweat rate," Stellingwerff said.

Once an athlete is acclimated and starts sweating more, it allows him to dissipate heat, which ultimately enables him to perform better.

Because an athlete's sweat rate can change so much, Stellingwerff tests his endurance athletes between two and four weeks before the race, he said. This allows him to be as accurate as possible with hydration advice.

A final important component in determining hydration needs involves the gastrointestinal (GI) tract. The more fit you are, the faster you're going, the hotter it is, the more your blood will go to your muscles during exercise, as opposed to your GI tract, a phenomenon known as blood shunting, Stellingwerff explained.

"So the GI tract of an elite athlete almost shuts down (during a race)," he said.

This means it can be easily aggravated by certain foods or too much water, which can also cause unwanted diarrhea, Stellingwerff noted.

"Four weeks out from a race, we're testing the gut (to see what it can tolerate), especially during workouts that are at race speed, workouts that target heat and humidity at race paces," he said.

Even with careful salt and sweat testing, things such as race-day anxiety can upset the GI tract. Because of this inevitable anxiety, Stellingwerff said he often suggests his athletes drink slightly less on race day than they know their bodies can tolerate in training.

It's a delicate process, but the details are important. They can make all the difference to an elite triathlete.

"It's not just showing up on race day," Stellingwerff said.

The approach is much different than that recommended by big-soda ads that tell you to "drink, drink, drink," he added.

Dialed In

By 2012, Whitfield had his game-day hydration down pat.

He used solid foods to hydrate before a race, often eating chia seeds, which are thought to help absorb and retain water. He also turned to fruits, such as watermelons, and vegetables with a high water content, such as cucumbers.

"I would find hydration in fruits and vegetables instead of drinking water," Whitfield said, adding that this worked better for him than drinking 2 L of water alone.

He would eat his last big meal four hours before a race, often a four-egg-and-yam omelette, and salt water.

"I'd use Himalayan rock salt," Whitfield said.

Himalayan salt contains 95 to 96 percent sodium chloride. Many endurance athletes consume it today because it is believed to help with electrolyte balance, although, as Rosner explained, science has yet to prove this claim.

Like Whitfield, Stellingwerff promotes what he calls a "food-first" approach.

"The more solutes you have in your drink or your food, the more fluid will be absorbed. So water is great, but it's the least absorbed of everything," he said.



At some endurance events, medical directors have reduced the number of aid stations to prevent overdrinking on the course.

“IN TODAY’S MODERN WORLD, THERE’S ALWAYS WATER. THERE’S SO MUCH WATER THAT PEOPLE ... DON’T ACTUALLY KNOW WHAT THIRST IS.”
—DR. TAMARA HEW-BUTLER

He suggested adding sodium and potassium into pre-race fluids, and even drinking milk or baby formula as they contain both protein and carbohydrates.

“Because any time you’re absorbing (any macronutrient) across your intestine, it’s going to pull water with it,” he said.

Stellingwerff specifically remembered encouraging Whitfield to eat chia seeds, bananas and dates.

Whitfield took the advice. Two hours before a race, he would eat a banana to stay satiated. He’d also ingest a pre-race endurance gel

full of electrolytes and maybe almond butter on toast. Then, 45 minutes before the race, he would take a 400-mg caffeine tablet.

After this, his decision to drink any water before the race simply depended on whether he was thirsty. Minutes before the race, he might take a final sip or two of water with a bit of flavoring if he felt he needed it.

Then it was go time.

Once the race was on, hydration decisions were largely based on feel, as well as race circumstance. Sometimes drinking was unrealistic.

“It’s really easy for me to say ‘drink to thirst,’ but when an athlete gets thirsty they may not have an opportunity to drink,” Stellingwerff said.

Maybe an athlete just can’t get his hands on water. Or maybe the moment the athlete gets thirsty it’s time to make a move on a competitor. Or sometimes the bike course has a lot of turns. And often the sheer intensity of the race makes drinking difficult.



Dr. Mitchell Rosner believes athletes should place their trust not in advertising but their body’s thirst mechanism.

“They’re running well under the 5-minute-mile pace. Try to do that and drink at the same time,” Stellingwerff said.

Intensity and race logistics aside, sometimes elite triathletes choose not to drink—even when they’re thirsty—especially if they’re susceptible to GI-tract reactions that can be brought on by drinking.

Whitfield said he tried to drink when he was thirsty and when circumstances permitted, but he also knew it wasn’t going to kill him if he held off and went just a couple more miles without water. When he arrived at a mid-race water station, sometimes he used it just to rinse off.

Looking back on his career, Whitfield said he believes many of his mid-race hydration decisions came down to doing what his body was used to. Eating more gel or drinking more water during a race than he had practiced in training wouldn’t have been a good idea, as his body wouldn’t have been ready for it.

He also knew that getting a bit dehydrated and losing 2 to 4 percent of his body weight was something from which he’d easily recover. It was just part of his sport.

Today’s Challenge

Whitfield learned long ago that following hydration guidelines suggested by the ACSM and GSSI doesn’t help performance.

Elite triathletes like Whitfield have the luxury of learning the science from top experts in the field. They race at such high speeds that drinking—let alone overdrinking—is almost impossible. And they usually lose more water than the average person because their sweat rates are so high. Because of all of these factors, Stellingwerff calls drinking too much “a non-factor in elite endurance sports.”

Such is not the case in the recreational triathlon community. The average triathlete has ample time to chug water during the race. Often, he doesn’t sweat as much. And he likely doesn’t have access to expert scientists or the latest technology to help him with hydration planning

Instead, the recreational triathlete turns to mainstream media—to advertisements created by Gatorade or bottled-water companies—for advice, Hew-Butler said. Whether conscious or not of how he’s internalizing information, he becomes terrified of getting dehydrated and thinks he must drink as much as his body can tolerate.

“With advertising there’s no real regulation,” Hew-Butler said. “When (scientists) put studies out (about hyponatremia), it takes us a couple years, but ads can tell you you need water, and they can put it out tomorrow.”

And the consequences of listening to these ads can be dire for too many endurance athletes.

“The scary thing is it kills people,” Hew-Butler said. “And it kills healthy people.” ■

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

Ironman in Waterworld

Years of being told to “hydrate, hydrate, hydrate” caused first-time Ironman athlete Dan Fontaine to overlook the dangers of overhydration.

By Emily Beers

April 2015



Courtesy of Dan Fontaine

He had been training for his first Ironman for 12 months.

Dan Fontaine thought he had done everything right. He followed a careful training plan and implemented CrossFit Endurance workouts. He read books to educate himself on the do's and don'ts of getting through what he hoped

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would be no more than a 12-hour event. He even took a three-month leave of absence from his career as a civil engineer to train full time.

Fontaine focused on his nutrition, his sleep, his recovery. He turned to training books to help him draft a plan to avoid becoming dehydrated.

“The only problem was my plan had a big flaw,” 32-year-old Fontaine said almost five years later.

It never occurred to him that drinking too much during the race would dilute his blood-sodium levels to the point that—three hours in—he would vomit violently and be left on the side of the road in a depleted state, unable to continue for hours.

Fontaine was never officially diagnosed with exercise-associated hyponatremia (EAH), a potentially life-threatening condition that leaves an athlete with dangerously low blood-sodium levels. But he has since researched what happened to him and has confidently deduced he was hyponatremic in 2010 at an Ironman race in Penticton, British Columbia.

An athlete who drinks too much during exercise runs the risk of diluting blood-sodium levels to below the normal range of 135 to 145 millimoles per liter (mmol/L). Symptoms of EAH include fatigue, nausea, vomiting and seizures. The most serious cases have led to fatal swelling of the lungs or the brain. Damage from brain swelling—[exercise-associated hyponatremic encephalopathy \(EAHE\)](#)—has taken the lives of at least 12 otherwise-healthy people since 1981.

“A common scenario is that (many people) ignore their thirst mechanism and just drink continuously (to avoid dehydration).”

—Dr. Mitchell Rosner



Dave Re/CrossFit Journal

Dr. Mitchell Rosner advises athletes to rely on the body's thirst mechanism instead of unfounded claims in ubiquitous advertising.

Dr. Mitchell Rosner, professor of medicine at the University of Virginia, said because he wasn't in Penticton to assess Fontaine's condition in the moment, it would be impossible to give an exact diagnosis today. But, he added, the symptoms Fontaine experienced are “consistent with hyponatremia.”

Part of the reason athletes drink too much during endurance exercise stems from a deep-rooted fear many people have of getting dehydrated, said both Fontaine and Rosner. Advertising from companies such as Gatorade and various bottled-water companies, as well as advice from the American College of Sports Medicine (ACSM), has likely helped to perpetuate widespread fear of dehydration, Rosner said.

In 2007, for example, the [ACSM's official position paper on exercise and fluid replacement](#) recommended athletes pre-hydrate before exercise to prevent dehydration.

Other myths published by the ACSM include advice to [consume as much fluid as possible](#), as well as to diligently drink at regular intervals during exercise—all in the name of avoiding dehydration, Rosner explained.



Courtesy of Dan Fontaine

Dan Fontaine finished the 2010 Ironman in Penticton, British Columbia, but he's certain overdrinking almost ended his race an hour into the cycling segment.

In a satirical piece about hydration, comedian Jerry Seinfeld noted how powerful these myths have become.

"Wouldn't I get thirsty first?" Seinfeld rhetorically asked in response to people telling him, "You need to hydrate, Jerry. ... You gotta be hydrating. Make sure you're hydrating. Are you hydrating?"

"According to the fitness people on TV, if you feel thirsty, you're too late. What do you mean I'm too late?" Seinfeld continued.

This idea of being "too late" is a fallacy, Rosner explained. The best way to know when to drink is to listen to the body's internal thirst mechanism, he said.

"A common scenario is that (many people) ignore their thirst mechanism and just drink continuously (to avoid dehydration)," Rosner said.

If you're force-feeding yourself water—like Fontaine said he did during the Ironman—your body doesn't need water, Rosner added.

Although Fontaine couldn't pinpoint why he chose to chug water when he wasn't thirsty, he knows the fear of dehydration was never far from his mind. Advertisements, event organizers, the reading he did and the people he knew kept telling him to drink more, ultimately to his detriment.

Dehydration on the Brain

Fontaine began his Ironman morning with his regular pre-training meal: a smoothie with almond milk, seed oil, strawberries and protein powder.

"It was, like, a 1,000-calorie smoothie," Fontaine said.

Then he chugged about 16 oz. of water, ensuring he was hydrated at the start of the race. He continued to sip water until the race began.

The swim went well for Fontaine. Assuming it would be the hardest leg, he found himself more comfortable in the open water than he expected, finishing the 2.2-mile swim in 82 minutes.

"I felt good coming out of the water," he remembered.

Emotionally good but physically bloated, he said his stomach felt slightly distended.

"I swim with my mouth open, so I assume I swallowed a lot of lake water," he said of a factor he believes contributed to the bloating.

He added: "It was the same feeling I get when I hydrate heavily."

Fontaine didn't consider swallowing unwanted lake water in his hydration plan, so he kept drinking.

"People kept telling me how hot it would be in Penticton, so I wanted to make sure I wasn't going to get dehydrated," he said.

What worried him the most was how dehydration would negatively affect his performance.

"I thought I'd be dehydrated after swimming for an hour and a half because I was told, 'Even though you're cool in the water, you're still sweating hard! And in my mind, I

thought I hadn't been able to drink anything (during the swim), and I didn't want to some hours later hit a point of dehydration," he said.

To avoid dehydration, he stuck to his plan to chug a 16-oz. bottle of water right after the swim.

"In retrospect, during (shorter) triathlon races in the past, I would bike for an hour and not drink because I didn't feel like I needed it. ... But this was an Ironman, and I thought hydration was so important that I kind of had to force myself to keep up with my plan," Fontaine said.

Leading up to the Penticton race, one of the books Fontaine turned to for advice was Gale Bernhardt's "Training Plan for Multisport Athletes: Your Essential Guide to Triathlon, Duathlon, Xterra, Ironman & Endurance Racing." Bernhardt's advice was similar to what others had told Fontaine: Drink up.



Courtesy of Dan Fontaine

Without a coach, Fontaine set a goal of drinking 16 oz. of fluid every hour during the Ironman. Many elite triathletes set no hydration goals and drink only when thirsty.

"Dehydration levels as low as 2 percent of body weight are thought to impair athletic performance—perhaps by as much as 20 percent," Bernhardt wrote.

"People kept telling me how hot it would be ... so I wanted to make sure I wasn't going to get dehydrated."

—Dan Fontaine

He goes on to say athletes should drink "4 to 8 ounces every 15 to 20 minutes" during endurance training.

Fontaine remembered briefly reading about overhydration and sodium-water balance, but he doesn't remember coming across the term "hyponatremia" in the months leading up to the race, nor was he aware of how dangerous the condition can be.

"Had I had a coach, maybe it's something that would have come up," he said.

Elite triathletes today do receive advice from their coaches to drink to thirst, exercise physiologist Trent Stellingwerff explained in the CrossFit Journal article "Hydrating the Elite." However, many recreational or first-time triathletes, such as Fontaine, don't have coaches.

Fontaine carried on drinking every 20 minutes during the race, his ultimate goal being to consume about 16 oz. each hour.

He was one hour into the 112-mile cycle when he had to urinate.

"I passed a rest area, and there were Porta Potties and a bunch of people waiting in line, so I said, 'Fuck it, I'll go to the next one,'" he recounted. "Within five minutes after that, I started to cramp pretty severely. So I downshifted and slowed down. ... Within one minute, I pulled off to the side of the road and vomited violently."

Courtesy of Rachel Corey



An Ironman veteran, Rachel Corey said larger events generally include better-trained medical personnel. In some races, medical staff are acutely aware of the dangers of hyponatremia.

He added: "The cramps went on for an hour-and-a-half as I sat on the side of the road. I tried to recompose myself and get up and grab my bike, but every time I stood up the cramps got me and I couldn't stand up straight."

The only thing that marginally alleviated his discomfort was lying down. Every so often, he sat up and tried to drink. Each time, he vomited.

"And then it dawned on me that I wouldn't be able to drink until I had salt. But I didn't have any salt," Fontaine said.

Tired, nauseous and cramping severely in his stomach, Fontaine resumed his place on the side of the course, hoping someone would bring him salt.

After some time, Fontaine noticed a paramedic tent in the distance. He walked over, told the staff what had happened and asked for salt. They didn't have any.

Untroubled by Fontaine's belief that his blood-sodium levels were too low, the medical staff brushed off his concerns and asked him if he was going to continue the race.

"I'm not ready," Fontaine said.

He added, laughing: "Then I told them, 'So I'm just going to sit over there. If you see me pass out, do you mind taking me to the hospital?'"

"I tried to recompose myself and get up and grab my bike, but every time I stood up the cramps got me and I couldn't stand up straight."

—Dan Fontaine

Fontaine returned to his resting place until eventually the “sag wagon” came along.

“They’re the ones who pick up the people who quit the race,” he said. “I was last at that point. Everyone had passed me, and they asked me if I wanted to quit.”

He asked them for salt. They didn’t have any. Fontaine persisted. One woman darted off to a local fruit stand, where she acquired a jar of pickling salt.

“So I started eating it. I put my tongue on it and let it dissolve. I couldn’t swallow water without puking, but with the salt, I could now swallow water,” Fontaine said.

He carried on licking the salt for 15 minutes. The cramps disappeared. He started feeling better.

Although Fontaine noticed an almost instantaneous reaction to pickling salt, the science around salt supplementation is “controversial,” Rosner said. While supplementing with salt might seem like common sense to an endurance athlete, he added, the science is still unclear as to whether salt supplementation helps prevent or alleviate EAH.

Nobody to the Rescue

Dr. Tamara Hew-Butler, a professor of exercise science at Oakland University in Rochester, Michigan, has spent the last 15 years researching hyponatremia. One of her goals is to educate the endurance community—including athletes, coaches, medical staff and volunteers—about the dangers of drinking too much. Hew-Butler is herself a marathon runner.

“Our efforts so far have been grassroots—individuals doing the best they can within their communities.”

—Dr. Tamara Hew-Butler



Dave Re/CrossFit Journal

Dr. Tamara Hew-Butler has researched hyponatremia for 15 years after seeing its effects at the 2000 Houston Marathon.

Hew-Butler’s interest in EAH started in 2000 at the Houston Marathon in Texas. It was a particularly hot day. Many runners drank too much, and four ended up in comas. One of the major problems: Medical staff at the event assumed the runners were dehydrated and administered IVs, ultimately making the situation worse. (More information about this incident can be found in the CrossFit Journal article “[Confronting the Drinking Problem.](#)”)

Since that day in 2000—a day Hew-Butler said she will never forget—she has been committed to her cause. While she said people are more educated about hyponatremia than they were in 2000, there’s still a long way to go, especially when it comes to educating medical volunteers at endurance events.

“Whether or not race participants, spectators, event staff, medical personnel ... are educated or not really comes down to the knowledge base of the event medical director.

So you will see large disparities in care depending on how knowledgeable the head medical person is and how well he can persuade the race director to hold training sessions with everyone involved in the race,” Hew-Butler said.

She added that larger endurance events, such as the Boston Marathon, which hosted more than 35,000 participants in 2014, generally do a better job of training their medical team and volunteers than smaller events.

As detailed in the CrossFit Journal article “WaterWise,” Dr. Dale Benjamin Speedy had success in the late 1990s educating the endurance community in New Zealand about EAH.

Speedy implemented a prevention program to educate aid-station workers to avoid forcing liquids on athletes. His



Courtesy of Rachel Corey

Corey believes a friend suffered from hyponatremia during a race but said on-site medical personnel weren't sure what was wrong, highlighting a large hole in the race-day safety net.

findings—published in 2000 in the Clinical Journal of Sports Medicine article “Diagnosis and Prevention of Hyponatremia at an Ultradistance Triathlon”—noted the number of New Zealand Ironman participants who were treated for EAH decreased from 3.8 percent in 1997 to 0.6 percent in 1998.

Rachel Corey, a longtime triathlete, has completed two Ironman and 10 half-Ironman races. The 33-year-old from Boise, Idaho, is a registered nurse who's participated in triathlons in Arizona, Florida, Idaho, Oregon and Washington. Her thoughts echoed Hew-Butler's.

“Medical staff at the larger events seem to be more educated. ... In the smaller races, I don't think they're well trained in that area.”

Small events, Corey added, don't have the funding or resources.

“But in larger races they're starting to weigh runners before and after (the race). If they gain weight, then you know they're overhydrated,” she said.

Athletes should expect to lose between 2 to 4 percent of their body weight during an endurance event, Hew-Butler explained. If an athlete finishes a race or a training session weighing the same or more than when he started, he's overhydrated, she said.

Corey said she believes a friend of hers suffered from hyponatremia during a triathlon race but wasn't officially diagnosed because medical personnel at the event weren't sure what was wrong and had no way of administering a blood test.

Most paramedics at endurance events don't have access to portable electrolyte monitors, so they're unable to measure blood-sodium levels themselves, Hew-Butler said. Point-of-care devices that allow measurement of an athlete's blood-sodium levels on site often cost in the neighborhood of US\$8,000, Hew-Butler explained. Most events don't have funding for this.

Despite the financial limitation, Hew-Butler said medical personnel should still be able to assess an athlete based on his or her symptoms.

“At first, we (clinicians) tried to classify hyponatremia by a numerical value,” she said.

“I definitely didn’t know how dangerous it was. I didn’t realize until much later that people die from it.”

—Dan Fontaine

Mild hyponatremia was defined as falling between 130 to 134 mmol/L, while 120 to 129 mmol/L was considered moderate, and less than 120 mmol/L was seen as severe. A blood test is required to discover this information.

“But then we realized that the number didn’t really tell us how sick an athlete was (or) have any predictive value on how well the athlete would recover,” Hew-Butler said.

She explained scientists believe the “rate of decline”—the amount any given athlete’s sodium concentration changes during exercise in relation to where it started—is likely more important than the number measured by a blood test.

“So now we classify severity due to clinical signs and symptoms,” she said.

Fontaine, who was vomiting profusely, would have been considered to have moderate EAH had knowledgeable medical personnel assessed him, she said. Mild symptoms include lightheadedness, dizziness and nausea, while severe symptoms include altered mental status, disorientation, seizures and coma.

This is the kind of education medical staff and volunteers at endurance events need, Hew-Butler said. Judging by Fontaine’s story, there’s still work to be done, she noted.

“Our efforts so far have been grassroots—individuals doing the best they can within their communities,” Hew-Butler said.

While it’s a good start, she added she’s interested in reaching athletes and medical personnel on a wider scale—to stop situations like Fontaine’s.

“There persists a lack of knowledge on appropriate hydration strategies and even basic knowledge on what causes EAH or, even worse, that drinking too much fluid during exercise can kill athletes,” she said.

14 Hours, 58 Seconds

Today, Fontaine views his Ironman experience much differently than he did in the moment. Back then he still wanted to finish the race.

After two hours of resting mid-Ironman, Fontaine got up and started cycling again. He no longer cared about his time. He was just happy to be moving. At one point, he pulled over and gave another athlete his spare tire. He helped another fix a chain.

When he reached the storage area where he kept his bag, he drank a smoothie. Later, he had some cold chicken soup. Every time he ate, he felt a bit better.

Fontaine finished the cycle just five minutes before the cut-off to begin the 26.2-mile run.

Nobody was happier to see him run by than his parents, who had been worried sick about their son. They had been watching the progress report to see where he was, and suddenly information about his whereabouts stopped coming.

“I ran by them. They were so excited to see me. And I told them as I ran by, ‘I have a good story for you.’”

Fontaine finished the Ironman in 14 hours, 58 seconds and then set out to discover what went wrong.

“I went home and started looking into it ... to find out what happened. I knew that I screwed up on my salt-water balance, but I hadn’t processed hyponatremia,” Fontaine said.

“I definitely didn’t know how dangerous it was. I didn’t realize until much later that people die from it.”



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

Fear Factor

Kevin Ogar, Tony Blauer and others explain how to overcome trepidation to find success in the gym and in life.

By Hilary Achauer

April 2015



It was July 2010, my first week of CrossFit. The affiliate had opened a month prior, and I was the only person in the noon class. After I warmed up, the coach brought out a 20-inch wooden box and told me to jump up on it.

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I looked at the rough edges of the homemade structure, eyeing the sharp corners, the screws embedded in plywood. Jumping on top seemed like a terrible idea. But my coach was looking at me expectantly, so I bent my knees and made a half-hearted jump, rising a few inches off the floor. I was nowhere close to the top of the box.

I kept trying, but each time I got ready to jump I'd look at the sharp-edged box and hesitate. I was terrified of what might happen if I really tried.

Finally, my coach pointed to a tractor tire in the corner of the gym.

"Jump on that," he said.

"How tall is it?" I asked.

"Just jump on it," he said.

I walked over to the tire, bent my knees, jumped and ended up on top of the tire.

"That's 22 inches tall," my coach said. "Now jump on the box."

And I did.

I didn't improve my jumping ability on the walk to the tire, but a soft-edged target removed my fear. Once the fear was gone, the task became manageable.

Everyone feels fear. The secret to success is managing that fear.

Everyone feels fear at some point in CrossFit—or in any challenging athletic endeavor. Even the most experienced athlete eventually finds himself or herself face-to-face with a weight or a workout that makes the knees shake.

Everyone feels fear. The secret to success is managing that fear.



Dave Re / CrossFit Journal

CrossFit Defense's Tony Blauer says the "fear loop" is a large factor in not achieving goals.

In his book "The Fear Project," Jaimal Yogis talks to neuroscientists, psychologists and elite athletes about how to overcome fear. Contrary to what most of us were taught, the best way to manage fear is not to push it aside but to acknowledge it, accept it and then take action. Yogis puts this practice to the test at Mavericks in Northern California, facing down some of the biggest, scariest waves known to surfers.

Similarly, Tony Blauer spends much of his CrossFit Defense seminar addressing how fear affects performance. He shares specific techniques athletes and coaches can use to overcome fear.

Like Yogis, Blauer says the only way to deal with fear is to face it head-on.

The Fear Loop

About a year ago, Kevin Ogar suffered a critical injury to his spine after a failed attempt on a 3-rep-max touch-and-go snatch event at a competition. The accident left him in a



NCHPAD

After his accident, Kevin Ogar continued training, setting his sights on the Paralympic Games.

wheelchair, a paraplegic, but it didn't stop him from doing what he loves, which is training and coaching at CrossFit Unbroken in Englewood, Colorado.

Ogar started training as soon as he could after the accident. He set a new goal. Instead of training for the CrossFit Games, Ogar began training to qualify for the 2016 Paralympic Games.

In order to qualify for the Paralympic Games in weightlifting, Ogar needed to improve his bench-press numbers. In October 2014 he benched 260 lb. for 5 reps. He was going for 8 but failed on rep 6. He couldn't get the weight off his chest.

That weekend, Ogar attended Blauer's CrossFit Defense seminar at CrossFit Unbroken.

One of the things Blauer teaches in his seminar is the "fear loop"—how to recognize it and how to break out of it. Blauer has turned the word "fear" into an acronym: false expectations (or evidence) appearing real. Many things

can trigger a fear reaction, but whatever the trigger, once a person starts feeling the psychological and physiological effects of fear, it's difficult to come back.

That's where Blauer and his seminar come in. Blauer talks about breaking out of the fear loop by coming up with a plan, something for the mind to focus on other than fear.

Recognizing you are stuck in the fear loop is the first step. The second is to focus the mind on a plan, a cue or even just one word. The same is true if you're a coach working with a fearful athlete.

As he listened to Blauer, Ogar realized he was stuck in the fear loop with his bench press. He was worried about what the weight could do to him, not what he could do to move the weight.

"After the CrossFit Defense course, I went in and kind of recognized the fear loop, where I was focusing on what would happen if I failed the bench press instead of what I needed to do to get the bar off my chest," Ogar said.



RE Factor Tactical

"I struggled with rope climbs when I first got out of the hospital because of fear, fear of falling or hurting my back. Recognizing that fear loop has completely turned rope climbs around for me. Now they are one of my favorite things to do."
—Kevin Ogar

Ogar said his thoughts had previously been a cycle of, "Oh my God, this is heavy. They are gonna have to get this bar off me if I fail. What's going to happen to me if I can't get this bar off? It will really suck if I fail at this. I'll need to redo it."

On the Monday after the CrossFit Defense seminar, Ogar tried something different. In order to make the reps, Ogar knew he needed to keep his elbows in and maintain speed off his chest throughout each of the 8 reps.

As he set up for the lift, instead of thinking about failing, Ogar said he kept repeating the same thing to himself: "Speed off the chest, speed off the chest, speed off the chest."

Ogar benched 265 lb. for 8.

"I called it 'watching one TV instead of focusing on five,'" Ogar said. "I put a mantra or a chant into my head, so all I could think about was what I needed to do."

Coaching Fearful Athletes

As he continues to rehabilitate, Ogar has been working on using long leg braces and crutches to stand up and walk around.

"I got new crutches, and I've been really struggling with standing up and sitting back down. (I've been) just failing over and over and over again," Ogar said.

Then his physical therapist gave him a new cue, telling Ogar to relax his shoulders.

"I recognized I was in the fear loop. I recognized I wasn't really focusing on what I needed to be doing. All I was focusing on was, 'If I don't do this right, I'm going to fall,'" Ogar said.

"Falling was the only thing I could really focus on. So once I kind of recognized that fear loop, I was able to switch my mindset and focus on relaxing my shoulders so I could get a better push. Within a few attempts, I went from having to be completely spotted to being able to get back up on my own," he said.

Focusing on negative feelings and experiences is very common. In fact, scientists say it's what made our species successful. When humans were first evolving, it was of utmost importance to avoid real danger. Scientists believe our brains developed a negativity bias, meaning fearful experiences leave a much greater imprint on our brains than positive, happy experiences.

Within the first month of trying to rescue athletes from the fear loop, Ogar said he helped people in his classes achieve at least six to 10 new PRs on their lifts.

"Basically, negativity bias is about survival. Nature likes skittish creatures because skittish creatures survive," Rick Hanson said in "The Fear Project."

Fear ... (continued)

A neuropsychologist, best-selling author and co-founder of the Wellspring Institute for Neuroscience and Contemplative Wisdom, Hanson said in today's world, most of the time our fears are exaggerated. We have a fear reaction to situations that are not actually harmful—like a 20-inch box or a barbell loaded to a weight out of our comfort zone but well within our ability.

Since attending the CrossFit Defense seminar, Ogar has not only used Blauer's fear-management techniques for himself, but he's also helped the athletes he coaches overcome fear. It's been particularly useful when he sees someone struggling with an Olympic lift.

"They'll miss and miss, and I'll ask them what they are focusing on. They will say they don't know," Ogar said.

"Let's get you focused on something," he'll tell them. "Are you focused on what is going to happen when you fail or what you did wrong last time? Or are you focusing on what you need to do (on) this rep to get it better?"

Most of the time, Ogar will learn the athlete is thinking about the mistake on the last rep.

"Instead of focusing on, 'I didn't get my hips fully extended,' focus on what you need to do to get your hips fully extended," Ogar said.

Within the first month of trying to rescue athletes from the fear loop, Ogar said he helped people in his classes achieve at least six to 10 new PRs on their lifts.

"It makes coaching a little easier when you know what you're focusing on," Ogar said.

"When I start classes, I tell (the class) what they need to focus on in the workout to take a pre-emptive step to keep them out of the fear loop," he said.

If he has an athlete he knows struggles with wall-ball shots, he'll tell her to choose a mantra like, "Solid squat, solid squat."

"I've seen people PR their workouts like crazy just by refocusing what they're thinking about during a movement they suck at," Ogar said.

"Instead of just yelling 'Go,' (recognize) why they aren't going and (try) to fix that," Ogar said.



Dave Re / CrossFit Journal

The facial expressions of athletes often reveal their thoughts. Good coaches can help athletes refocus to find the confidence they need to succeed.

Use the Fear

Todd Thompson is a career firefighter. The 41-year-old started doing CrossFit in 2008 and opened his affiliate, CrossFit Grit, in Saint Simons Island, Georgia, in 2010.

Thompson attended Blauer's CrossFit Defense seminar in 2013. The experience had such an effect on Thompson he is now part of the CrossFit Defense staff.

During the lunch break at the first seminar he attended, Thompson decided to join a group working out. They were doing one clean every minute on the minute until failure.

About eight months earlier, Thompson had injured himself trying to clean 290 lb.

He caught the clean very low and hurt tendons in both of his wrists as he went down into the squat. Thompson couldn't bend his wrists at all for a few weeks, and it was a few months before he could hold a bar in the front-rack position.

After he healed, Thompson went back to heavy lifting, but every time he got close to 285 lb. he'd remember the injury and couldn't make the lift.

The weight became more than plates on a bar.

"That weight is the bully at school. That weight is the boss at work that you give more power to or you don't give him your ideas because you're afraid of getting knocked down," Thompson said.

His injury—now completely healed—was on his mind as Thompson joined in on the clean workout. The minutes ticked by and the weights increased. Thompson was feeling good. He cleaned 255 lb., then 275 lb., then 285 lb.

"I load up and it's 290 lb.," Thompson remembered.

"I was telling myself, 'Here we are again.' I got that nervousness. I got that weak feeling in my body, because I know we've been here before. And so it was instant that I thought back to the fear loop."



Tatyana Kirichenko

Firefighter Todd Thompson was so affected by the CrossFit Defense seminar that he worked his way onto its staff.

Thompson had just heard Blauer give his talk about the fear loop. He knew his mind was stuck in the loop, and the only way to break out was to come up with a plan.

"I knew if I didn't pull hard enough and get under fast enough with my elbows, I was going to catch it low and potentially break my wrists. I had already had negative feedback from that lift, so what I started doing was I started making a plan. The plan was this: I had been working out for eight months since this happened. I knew that I was stronger. I knew that I had better technique. And so (I thought), 'It's right here in front of me, and I've just got to pull it,'" Thompson said.

Thompson stepped up to the weight, pulled it and successfully cleaned 290 lb. The next lift was 300 lb., and Thompson got under the weight and stood up without a problem.

"It wasn't that I was so much stronger," Thompson said. "It was that I could do it without the fear. It's realizing you have the skills—you can do it."



Tatyana Kirichenko

"The fear is an extra battery pack that is going to give you more power." —Todd Thompson

This moment was revelatory for Thompson. He learned not to deny the fear or try to push it away but to use it.

When Thompson is coaching, he tells his athletes the fear is a good thing.

"Your body is smarter than you are. When you do get the butterflies in your stomach, the sweaty hands, the nervous anticipation for what's happening, that's your body telling you you're about to get into a fight, and it's now real."

Thompson's advice to himself and his athletes is to harness the fear as energy and power, not shoulder it as a burden.

"The fear is an extra battery pack that is going to give you more power," Thompson said.

Fear Is Universal

Every athlete, even the most experienced competitor, feels fear. Denying fear will not work, because no person is without fear, Blauer said.

"Just let the fear be there. Don't run from it. Don't identify with it. Don't fight it," Yogis wrote in "The Fear Project."

Instead of having a panic reaction to fear, the trick is to recognize and accept the fear, and then focus the mind on more useful thoughts.

Once the athlete acknowledges the fear, the next step is to focus the mind on something else—a specific cue, a mantra, something to think about other than the fear.

With that mantra or cue running through your head, put your hands on the barbell, grab the rope, or step up to the box and jump.



About the Author

Hilary Achauer is a freelance writer and editor specializing in health and wellness content. In addition to writing articles, online content, blogs and newsletters, Hilary writes for the CrossFit Journal. To contact her, visit hilaryachauer.com.

THE CrossFit JOURNAL

VIRTUOSITY

Virtuosity 7: One Spirit

Robin Blackburn discovers the magic of the CrossFit community in Kuala Lumpur, Malaysia.

By Robin Blackburn

April 2015



Robin Blackburn

"This movement is the direct result of a marvelous little gym in Santa Cruz, California. And that wonderful little gym has been replicated 1,000 times over and for the most part with extraordinary fidelity." —CrossFit Founder and CEO Greg Glassman

A fat girl walks into a box . . .

Yeah, I bet you want to hear all about her life-changing transformation. The pounds lost. The self-confidence gained. The things all good CrossFit transformation stories are made of. And yes, I love those stories.

1 of 2

This isn't that story. You see, I'm still a fat girl. I came to the box with a lot of self-confidence. And while you'd think the overweight woman would be looking to lose a few pounds, that wasn't the case. But I was looking for something: I was looking for friends.

In the past, a gym has always provided me with a circle of friends as we moved around the United States. Some of my closest friends in the U.S. are the people I spent time with at various gyms in which we traded sweat and smartass comments throughout our workouts. I needed those people.

A little over a year ago, I moved from North Liberty, Iowa, to Kuala Lumpur, Malaysia. When I arrived, I was searching for a "gym"—a place I could go work out, get my sweat on, and, as had been the case in the past, meet some friends. But I'll be honest: Driving here in Kuala Lumpur can be a little daunting, and the nearest globo gym is about a 10-minute drive away. I didn't want to have to drive to the gym in traffic. (OK, OK: I did lack a little self-confidence in my big-city driving skills.)

I began searching for alternatives. Across the street from my house is a shopping center, and in that shopping center is a boxing gym and CrossFit Vidatha. You know which I chose—and I never looked back.

I'll admit I walked into the box a little skeptical of the whole we're-a-community, peace-love-harmony stuff, even though that was what I had always heard about CrossFit and that's what I was truly looking for.

CrossFit Vidatha has done the CrossFit brand proud. It has lived up to all the hype about "community," and then there's the fabulous coaching—can't forget about Coach Madhusudhan Aravindhakshan.

My dearest friends are at this box. There's Jo, with whom I often share a bar as we encourage one another during squats and presses. There's Susan, who has quickly become a fantastic friend and takes me golfing when we're not doing burpees. How about Mabel, who traveled with me to Seoul, South Korea, last spring so we could go to the CrossFit Games Asia Regional? Can't forget the awesome morning crew, who meet for coffee and solve all the world's problems with a little caffeine. And I can't forget Damian, who took me and my family for Korean barbecue because he knows we've never tried it and he was sure we'd love it.

I've only scratched the surface, but just know that the CrossFit community spirit is well represented here in Kuala Lumpur at CrossFit Vidatha.



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 CrossFit JOURNAL

The Hip and Athletic Performance

Zachary Long takes a closer look at hip anatomy and identifies common dysfunctions that can limit CrossFit athletes.

By Zachary Long

April 2015



Brian Malloy

The hips serve as the primary generator of force in the majority of movements performed in athletics, and this statement remains true for the exercises most commonly performed in CrossFit.

The pelvis, lumbar spine and core play a vital role in stabilizing the trunk to allow force to be transferred through the body.

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Despite the importance of the lumbo-pelvic-hip complex, dysfunction of muscle activation and flexibility is very common. These dysfunctions can greatly decrease performance, and it is therefore important to identify common impairments seen in these areas and better understand the hips' relationship with the pelvis and lumbar spine.

Anatomy Review

The hip is a ball-and-socket joint formed by the articulation between the head of the femur and the acetabulum. As seen in Figure 1 below, the acetabulum provides significant coverage of the femoral head, giving the joint a high level of stability. This allows the hip joint to support heavy loads and maintain the stability needed to generate high levels of power.

The acetabulum is formed by the fusion of the three bones: the ilium, ischium and pubis. Together, they are referred to as a hemipelvis. Each hemipelvis connects anteriorly with its contralateral counterpart at the pubic symphysis and posteriorly with the sacrum. The sacrum and coccyx form the lowest segments of the spine. Above the sacrum are the five vertebrae of the lumbar spine (1). Together, the proximal femur, pelvis and lumbar spine are referred to as the lumbo-pelvic-hip complex (LPHC) due to their intricate interconnections.

A variety of movements are available within the LPHC. The lumbar spine can flex, extend, rotate and side bend. At the pelvis, anterior and posterior tilting is possible. If one were to visualize the pelvis as a bowl filled with water, anterior tilt would spill water forward, and posterior tilt would do the opposite. The hip joint can flex, extend, adduct, abduct, internally rotate and externally rotate.

Movement in one joint of the LPHC affects the surrounding joints. For example, anterior tilting of the pelvis results in flexion of the hip and extension of the lumbar spine. Conversely, posterior tilting of the pelvis is seen with hip extension and lumbar flexion.

The gluteal muscles are the most commonly discussed hip muscles due to their extreme importance in athletic movements. The gluteus maximus is the largest of the three gluteals. The glute max originates in various attachments along the posterior pelvis, sacrum and coccyx and runs inferiolaterally to its insertion into the iliotibial tract (IT band), a dense band of connective tissue on the lateral thigh.

The glute max is a powerful hip extensor that externally rotates the femur and posteriorly rotates the pelvis. The glute max plays a critical role in power production for athletic movements.

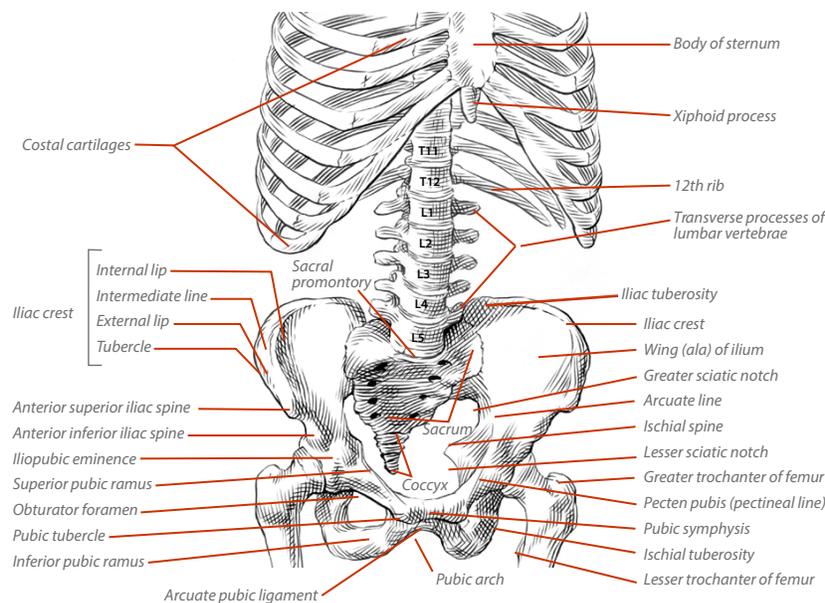


Figure 1: Boney anatomy of the lumbo-pelvic-hip complex.

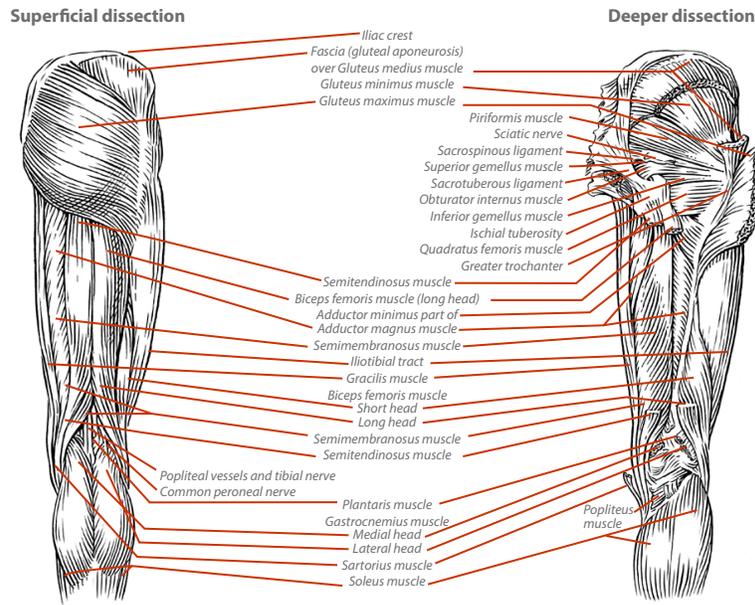


Figure 2: Muscles of the posterior hip and thigh.

The gluteus medius and minimus begin on the ilium and insert onto the greater trochanter on the lateral side of the proximal femur. These two muscles internally rotate the thigh, abduct the thigh and maintain a stable pelvis during single-leg positions, such as those seen in walking and running (1).

Together, all three gluteal muscles are important for controlling adduction of the thigh during activities such as squatting. Without their proper activation during a squat, the femur adducts, leading to the knees traveling toward each other during descent. This movement, also referred to as knee valgus, has been associated with multiple lower-extremity sports injuries in recent research studies and is often considered a movement fault. It is important to note that in examining the technique of many top weightlifters, a valgus knee movement is not uncommon, and these lifters seem to suffer no negative effects.

The hamstrings also play an important roll in hip extension. The semitendinosus, semimembranosus and biceps femoris all have an attachment to the ischial tuberosity on the inferior pelvis. The biceps femoris also has a proximal attachment on the posterior femur. All three hamstring muscles insert inferior to the knee joint,

giving them the ability to flex the knee in addition to their function as hip extensors (1).

On the anterior hip, several muscles function to flex the hip. The tensor fasciae latae (TFL) inserts onto the anterior iliac crest and inserts on the IT band. The TFL flexes and internally rotates the thigh, as well as abducts the thigh in combination with the gluteals. The rectus femoris is the only of the four quadriceps muscles to cross both the knee and the hip joint. This muscle both extends the knee and flexes the hip. The iliacus originates on the iliac and anterior sacrum and joins with the tendon of the psoas to insert on the lesser trochanter of the femur. The psoas originates on the five lumbar vertebrae and the 12th thoracic vertebrae, and, together with the iliacus, it flexes the hip joint. Together, the iliacus and psoas are often referred to as the iliopsoas. Finally, the sartorius attaches to the anterior superior iliac spine and inserts onto the medial tibia, allowing it to flex, abduct and laterally rotate the thigh and flex the knee (1).

The pectineus, adductor longus, adductor brevis, adductor magnus, gracilis and obturator externus make up the muscles of the medial thigh. These muscles all originate on the pubis or ischial tuberosity and have various

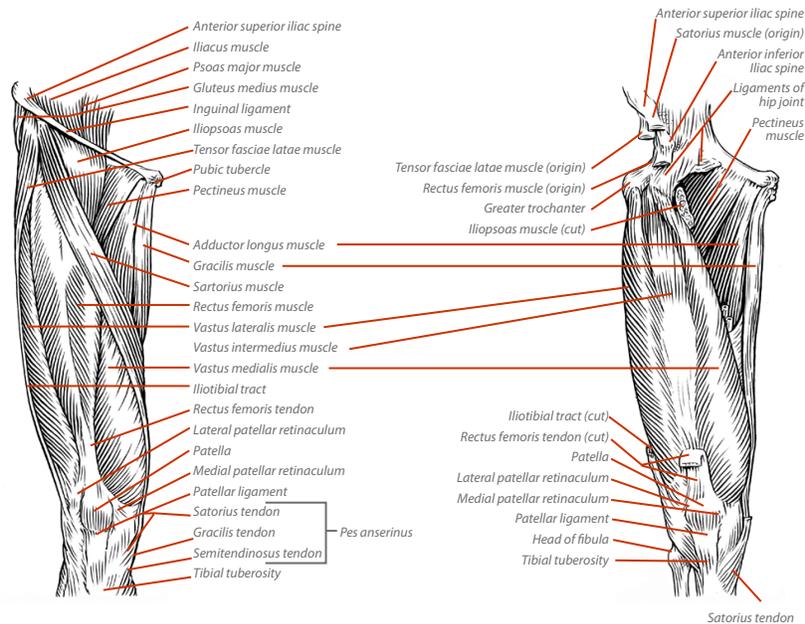


Figure 3: Muscles of the anterior and medial thigh.

attachments on the medial femur, and, in the case of the gracilis, the medial tibia. These muscles all work to adduct the thigh, and, depending on hip-joint positioning, the individual muscles may also flex, extend or rotate the hip (1).

The rectus abdominis is the most well known of the abdominal muscles. It runs from the xiphoid process to the pubic symphysis and forms the abdominal “six pack” in those with enough muscle definition. The rectus abdominis flexes the trunk and resists extension of the spine and anterior tilting of the pelvis. The internal and external obliques have various attachments on the lateral abdominal cavity. They provide lateral stability to the core and rotate the trunk. The transversus abdominis is the deepest of the abdominal muscles and runs laterally around the abdominal cavity. With the other three abdominal muscles, it helps to stabilize the trunk (1).

A variety of muscles, in several layers of the posterior spine, produce lumbar extension and resist lumbar flexion. These muscles include the erector spinae (iliocostalis, longissimus), quadratus lumborum, and the deep spinal muscles (multifidi, rotatores, interspinales and intertransversarii). These individual muscles may also produce lateral flexion of the trunk and rotation

of the spine (1,10). Their individual attachments and actions are beyond the scope of this anatomical review.

Common Dysfunctions

Dr. Vladimir Janda has previously identified a common pattern of LPHC dysfunctions he referred to as lower crossed syndrome. The hip flexors (rectus femoris and iliopsoas), as well as the lumbar-spine erectors, were classified as muscles prone to tightness in this syndrome. Janda also identified the gluteals and abdominal muscles to be frequently underactive. This combination of dysfunctions often leads to an overextended lumbar spine and anteriorly tilted pelvis due to inflexibility and lack of proper motor control (7). This is a commonly observed pattern in athletic populations, resulting in decreased stability and power, potentially decreasing athletic performance.

While these dysfunctions can commonly be seen during static postures, it is important to note that they may also present during dynamic movement. In those who demonstrate these dysfunctions dynamically, they have neutral posture at rest but fail to maintain neutral positioning during athletic movements.

A great example of this can be seen during the squat. Rather than maintaining a neutral spine and pelvis during the descent, an athlete with a dysfunction initiates the squat by moving into a position of hyperextension of the lumbar spine and an anteriorly tilted pelvis. As he or she descends further, the anterior tilt may result in pain in the anterior hip as the femur impinges on the acetabulum, pinching the tissues between these boney structures.

In order to reach full squat depth, the athlete must then flex the lower back and posteriorly tilt the pelvis, resulting in what is frequently described as “butt wink” (11). The movement of the lumbar spine from a position of extension to flexion while under load places unnecessary levels of stress on the structures of the spine (9,10). Positioning the spine in hyperextension during squatting has also been shown to be detrimental to spine structures (10); therefore, it is imperative to maintain a neutral spine during lifting both for spine health and for the optimal transfer of power throughout the body.

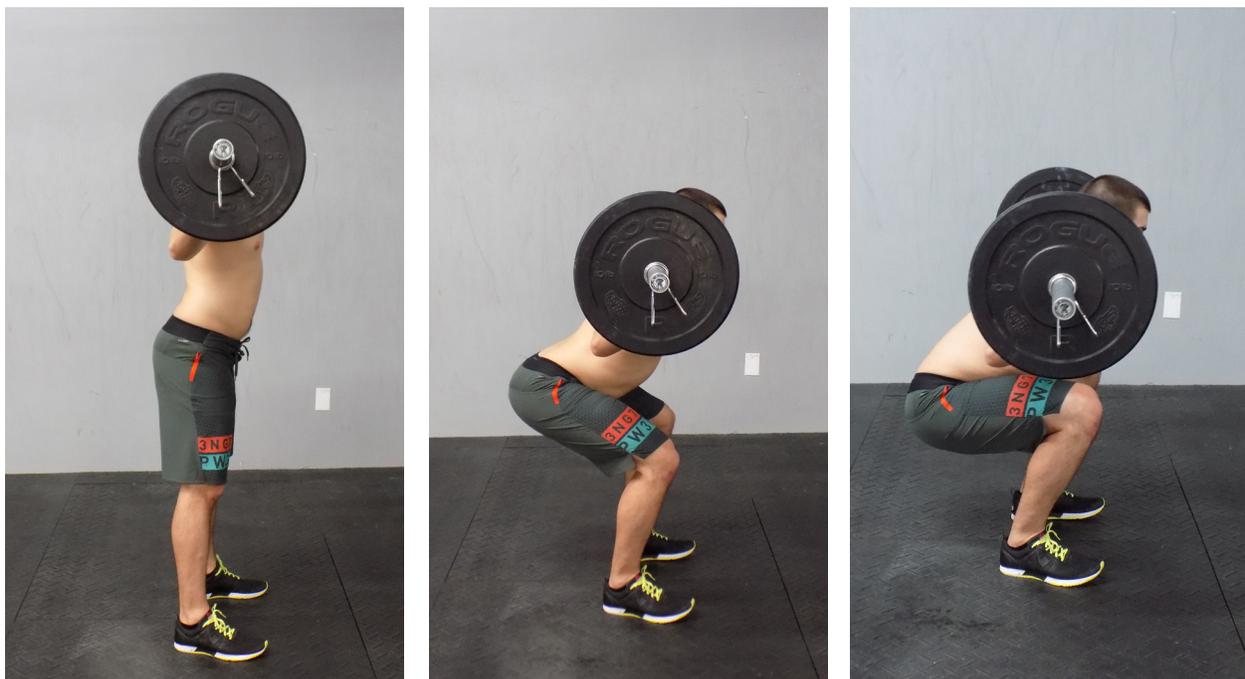
CrossFit Founder and CEO Greg Glassman has previously discussed what he referred to as muted hip function in the CrossFit Journal. Glassman stated some degree of muted

hip function is present in almost all athletes as they use knee extension rather than hip extension to produce power. Less-than-optimal recruitment of the glutes and hamstrings leads to poor spine positions, improper pelvic movement and excessive forces on the knee joint, with the ultimate effect being a “marked decrease in stability, balance and power” (3).

LPHC Athlete Analysis

Analysis of the LPHC of a CrossFit athlete should begin with standing posture because it quickly and easily provides insight into likely dysfunctions. While looking at an athlete from the side, examine the lumbar-spine position and pelvic tilt. Many athletes will exhibit the overextended posture of lower crossed syndrome due to some combination of inhibited glutes and abdominal muscles as well as possible tightness of the hip flexors and lumbar extensors.

One easy way to identify these dysfunctions is to look at the waistline of the athlete. If the posterior waistline is higher than the anterior, he or she is likely demonstrating this syndrome. This posture can be seen in the initial position of the athlete in the squat sequence below.



An overextended lumbar spine at the start of the squat may lead to hip impingement, and then lumbar flexion becomes necessary to reach full depth. This faulty pattern is referred to as a “butt wink.”

Courtesy of Zach Long

Testing Hip Flexibility

The Thomas test is a quick evaluation for tightness of the iliopsoas, rectus femoris and TFL. To perform the test, have the athlete lie on the back with buttocks on the edge of a table or box. Both knees should be pulled to the chest. Next, the coach should take one leg and slowly lower it while the athlete continues to hold the opposite leg to maintain a neutral spine.

With the test leg relaxed and lowered as much as possible, the coach should examine three things. First, does the tested hip reach full extension (0 degrees)? Failure to reach full extension indicates iliopsoas tightness. Next, examine the angle of the knee. In the absence of tightness of the rectus femoris, the knee should be at a 90-degree angle. If extended more than 90 degrees, rectus femoris tightness is present. Finally, the femur should not deviate laterally in the bottom position, as this would suggest tightness of the TFL.

An alternative test can be performed with the athlete lying on the stomach. The knee should be able to bend far enough for the heel to contact the buttocks. Inability to fully flex the knee without the hips rising off the ground or the lumbar spine extending would indicate tightness of the rectus femoris.

Hamstring flexibility can be easily tested with the athlete lying on the back. One leg is kept flat on the ground while the other is raised up with the knee straight. Hip-flexion angle should be examined at the point in which the athlete feels tension in the hamstrings or when the knee begins to bend. About 80-90 degrees of hip flexion is typically considered full hamstring flexibility. It is important that the non-tested leg remains flat on the ground and that the lumbar spine is positioned in neutral. Failure to maintain a neutral spine may anteriorly rotate the pelvis, which limits hip flexion and makes it appear that hamstring tightness is present when it may not be.

Assessing LPHC Stability and Motor Control

The hip hinge provides great insight into an athlete's ability to load the hips while maintaining a neutral spine. The hinge is important for CrossFit athletes to master, as it is the foundational pattern of movements such as the deadlift, the Olympic lifts and the kettlebell swing.



Courtesy of Zach Long

The Thomas test initial position (top); the athlete employing knee extension, indicating rectus femoris tightness (middle); the athlete showing good range of motion of the hip flexors (bottom). If the athlete cannot reach full hip extension, iliopsoas tightness is likely the cause.



Courtesy of Zach Long

***Hip hinge performed with overextended and flexed spines.
In some cases, lumbar flexion is much more dramatic.***

A dowel is placed along the athlete's spine so that it contacts the sacrum, thoracic spine and head (while the neck remains neutral). One hand holds the dowel in the arch of the low back, the other at the neck. With a slight knee bend, the athlete bends forward at the hips while striving to maintain a neutral spine by keeping the three points of contact between dowel and body. The athlete will flex at the hips until a stretch is felt in the hamstrings. In general, the athlete should be able to hinge low enough so that if the dowel was released and the arms lowered, his or her hands would be at approximately knee height.

During the hip hinge, failure to maintain contact with the sacrum indicates the athlete moves into lumbar flexion and cannot dissociate hip flexion from lumbar movement. This faulty movement may also be due to hamstring tightness. Inability to maintain thoracic-spine contact results from an athlete's tendency to move into lumbar hyperextension due to under recruitment of the abdominal muscles or glutes.

The trunk-stability push-up test provides excellent insight into an athlete's ability to resist lumbar extension and maintain a neutral spine. The athlete begins lying prone with the chest, stomach and hips on the ground. The knees should be extended so that they are not on the ground. The male athlete begins with his thumbs in line with his forehead and the female with thumbs in line with her chin; both have their hands at shoulder width and forearms raised off the floor. The athlete is instructed to ensure knees and elbows are off the ground before performing a push-up while keeping the torso rigid.

The coach watches to make sure the athlete doesn't reposition the hands lower before pushing and to ensure the entire body is lifted as a single unit. If the athlete is able to perform this movement, he or she has good core stabilization. If the athlete is unable to perform the movement, have the male reposition the thumbs in line with the chin and the female in line with the clavicle, then repeat (2). If the athlete is now able to complete the movement with proper technique, he or she has fair but non-optimal stabilization. If the movement is still unavailable, core stabilization can be considered poor. This test may also be limited by upper-body weakness in some individuals.

The Hip ... (continued)

McGill, Childs and Liebenson have previously studied endurance times of side bridges and trunk extensions to identify normative ratios for trunk stability. Side bridges were performed by having the participant positioned on one side with the top foot in front of the bottom and legs extended. The participant assumed a straight line along the entire length of the body while supported on the elbow and feet, with the top arm resting on the chest. Time was stopped when the participant lowered the hips to the floor.

A modified version of the hip-extension test can easily be performed using a glute-ham developer (GHD). Position the GHD so the feet are firmly against the footplate and the athlete's body is parallel to the floor during the test. The athlete's anterior superior iliac spine should be resting on the GHD pad. The anterior superior iliac spine is the most anterior point that can be felt on the superior hip bone, usually approximately at the height of the waistline (see Figure 1 for its location).

A box is placed in front of the GHD about 25 cm under the top of the front pad and serves as the rest point before and after the test is performed. The athlete raises his or her body off the box with arms across the chest to begin the test, and time ends when the horizontal position cannot be maintained. The study found ratios of 0.65:1.0 in side-bridge-to-extensor endurance for men and 0.39:1.0 for women.

Large variations from these ratios may indicate holes in an athlete's core endurance. It is important to note that study participants were healthy and an average of 23 years old, so these ratios cannot be generalized to be applicable to all populations (5).

An altered version of the glute-bridge exercise that is commonly used in injury rehabilitation can provide good insight into an athlete's ability to recruit the gluteals. The athlete should lie on the back on a box or table. His or her feet should be positioned about 12 inches lower than the height of the box, with the knees bent to about 90 degrees. Have the athlete then perform 20 bridges by lifting the hips off the table. These bridges can be performed one leg at a time or both legs simultaneously.

After completion, ask the athlete what muscle group felt most worked—the hamstrings or the glutes? While both groups are active during this exercise, the position of the leg during this test should make the glutes the more



Trunk-stability push-up performed with the entire body lifted while torso remains rigid.



An athlete demonstrates inability to stabilize the torso, resulting in a lag in the lower back.

Courtesy of Zach Long



Side-bridge (top) and extensor endurance tests.



Single-leg glute bridge to assess glute activation.

Courtesy of Zach Long

active of the two. If the athlete indicates the hamstrings are more fatigued, he or she likely has some level of gluteal inhibition that should be addressed (8).

In his explanation of muted hip function, Glassman outlined the push press as the best way to identify an athlete exhibiting this dysfunction. Athletes with muted hip function will lose neutral spine and pelvic positioning during the last several reps of a 20-rep-max push press. This disadvantageous position will result in the hamstrings and glutes being improperly loaded for explosive hip extension and power being predominantly generated by the quadriceps. Glassman stated that this will often occur even in those with perfect squats, and it results in decreased stability and power (3).

Another easy analysis of glute activation can be observed during the lockout of the deadlift. Frequently, lifters will substitute hip extension performed by glute contraction for lumbar hyperextension on the last portion of the lift. This compensation may happen on initial reps or as the athlete becomes increasingly fatigued. Hyperextension at lockout places the lumbar spine under unnecessary stress.

The squat provides ample options for identifying dysfunctions in the LPHC as well as the rest of the body. For athletes with difficulty squatting to full depth, performing a goblet squat by holding a kettlebell in front of the chest or performing an assisted squat by holding a coach's hands during descent can provide insight into whether squatting is more limited by flexibility or stability deficits. If the squat pattern is normalized with these tests, stability is the primary factor, as the test alters the athlete's center of mass, allowing many to more easily find anterior-posterior stability during the squat (2).

The body-weight overhead squat test is another test variation commonly used in fitness assessments. The test is performed with the athlete standing barefoot in a hip-to-shoulder-width stance. The toes face forward, and the arms are raised overhead. The athlete is observed performing five squats from the anterior, lateral and posterior viewpoints. The coach observes for foot and ankle movement, lateral movements of the knee, trunk lean, lumbar-spine positioning, ability to maintain arms overhead, neck position, and weight shifting. Compensations can then be used to identify potential overactive and underactive muscles that limit functional movement patterns (4,6).



Courtesy of Zach Long

A push press performed by loading the glutes and hamstrings (top) vs. quad-dominant execution (bottom).

A more detailed explanation of the NASM's version of the overhead-squat test can be found [here](#) (4) and [here](#) (6).

Correcting Dysfunctions

Addressing any dysfunctions found with tests such as those described above is important for optimal performance and injury prevention, but correcting dysfunctions often requires a long-term commitment for athletes.

A wide variety of treatment methods and philosophies can be used. Most commonly, decreased flexibility is improved using a combination of stretches, soft-tissue work and joint-mobilization techniques. Problems with stability and muscle activation are often addressed with progressive exercises designed to strengthen weak muscles and a variety of cueing methods to produce more desirable movement patterns.

No single treatment method is perfect, so the skilled coach will be open to differing philosophies and demonstrate the ability to individualize corrective strategies to each athlete.



The assisted squat or goblet squat decreases stability requirements without reducing the flexibility requirements of the movement.

Conclusion

These tests constitute a good baseline assessment of the lumbo-pelvic-hip complex of the CrossFit athlete. Testing and addressing dysfunctions in flexibility, stability and movement patterns of athletes can and should be performed by CrossFit coaches, as well as by athletes themselves.

Implementation of corrective strategies by the modern fitness professional is wise. In the presence of pain and injury, referrals should be made to appropriately trained medical professionals.



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