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Training in the Heat

Bill Starr offers advice to athletes training hard in the dog days of summer.

By Bill Starr

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This is the time of year when all athletes have to deal with temperatures soaring close to or over the century mark, as well as extremely high humidity in some areas. It's also when many sports teams begin their training for the upcoming season.

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Football is the most notable, but there are lots of other sports in which athletes work out diligently through the hot summer months. There are training camps, clinics and summer leagues for a host of sports: lacrosse, soccer, tennis, field hockey, track and field, and running. And this is also the heart of baseball and softball seasons. So these athletes have to deal with a relentless sun and heat.

Others train indoors, and the heat and humidity may be even greater than they are outside. Volleyball and basketball players and wrestlers have to go through their paces in stuffy, poorly ventilated gyms. So do those who compete in powerlifting and Olympic lifting. Add in those athletes who are striving to get stronger and refuse to allow the hot temperatures to keep them from their scheduled workouts and you have a multitude of people sweating an ocean of fluid every day all summer.

Some geographical parts of the United States have it rougher in this regard than others. The South and Southwest get much hotter than the Northern states,

but that doesn't mean that those who live in Illinois, Pennsylvania or Connecticut have the luxury of mild weather during July and August. I know from experience that a workout in Boston or Chicago can be just as stifling as one done in Dallas or Phoenix when conditions are right.

Heat can put you down for the count if you don't adhere to some rules.

Extreme heat can be debilitating to any athlete, regardless of age, if he or she does not take the proper precautions. Even very fit athletes have succumbed to the effects of the



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Athletes in many sports train in warm weather, but football players facing two-a-day training-camp practices are perhaps most in need of a plan to battle the heat and humidity.

sun when they ignored the signs and continued to push through a planned session. The main reason most end up on the short end of the stick is they just do not take the time to do what needs to be done when the temperature soars.

The majority of athletes who attempt to train as usual in hot weather don't end up passing out, but they do end up completely exhausted from a workout that was a piece of cake when the weather was milder. Many of them stop training when it's extremely hot and voice the intention of starting back up once cooler weather arrives. This is not the right way to deal with the problem. One of the basic tenets in strength training is consistency. Miss a session for any reason and it makes it easier to miss another. Pretty soon, training ceases altogether because no progress is being made. Then the athlete gets weaker. And fast.

It would be nice if we could build up an account of all the work we do in the gym, like a bank account, and be able to draw from it when we stopped training. A sort of retirement fund. Sadly, it doesn't work that way. It's no secret that detraining can occur within weeks, and its effects can be more pronounced on elite athletes.

Instead of ceasing training, athletes should make some adjustments and use some common sense. Quitting is not the answer; being smart is. There is no question that extreme heat makes it more difficult to get in a solid session. Even if a gym is cold and drafty, you can bundle up, and once you get in motion you can keep your body temperature at a comfortable level—especially if you move quickly through the workout.

Training in extremely hot conditions is another matter because you can only take off so many layers of clothing, even in the most liberal of fitness facilities. So it's very essential that you know just what to do when you're faced with getting in a workout in a hot, humid gym. It's not just a matter of having a productive workout; it's actually a heat issue. Heat can put you down for the count if you don't adhere to some rules.

Hydrate!

Water is the key. This nutrient, which we all take for granted, is crucial to every function in the body—temperature regulation, nerve-impulse conduction, metabolism, immune system, eliminative process, and all the rest of the workings of the body.



Staff/CrossFit Journal

Athletes at the CrossFit Games are often tested by the Southern California heat as well as the events themselves.

Two misconceptions get people in trouble:

1. It takes a large amount of dehydration to bring on negative reactions.
2. You can depend on thirst to inform you when you're at risk. It takes a surprisingly small amount of fluid loss, just one percent, for your body to become dehydrated, and you can't depend on your thirst to tell you what's happening.

Researchers have found that even a tiny shortage of water disrupts biochemistry of the human body and **can limit performance**. Water balance is the single most important variable in athletic performance. Besides affecting overall strength, dehydration causes the brain to shrink slightly, which in turn results in an impairing of the neuromuscular system, coordination, concentration and thinking.

It doesn't take a Rhodes Scholar to be able to figure out you're not going to be able to perform at your best when these things begin to happen in your body during any form of physical exertion.

Water is your best friend when dealing with very hot weather.

"But what about Gatorade and those high-energy boosters that have recently flooded the market?"

After all, Gatorade is loaded with electrolytes. Yes, and that's a good thing, but at the same time, it contains sugar, and sugar slows the assimilation process. And those high-energy drinks contain a huge amount of caffeine, which promotes rapid water loss. So no cola or coffee. I typically use coffee to get me kick-started for my cardio and weight workouts, but I have to do without that caffeine jolt when it gets hot. I'll come back to this discussion a bit later on.

Overheating and resulting deficiencies in fluids and vital nutrients can come about amazingly fast when temperatures climb to 100 degrees and humidity gets extreme. As much as three quarts of sweat can be lost in a single hour. When this happens, blood volume drops appreciably. If it drops too low, circulation becomes impaired so that the brain and other vital organs are deprived of oxygen.

Water is your best friend when dealing with very hot weather.

Heat illnesses fall into three categories: heat fatigue, heat exhaustion and heat stroke. Heat fatigue sufferers will experience cramps, usually in the legs and abdomen. If these symptoms aren't dealt with right away and the athlete continues to push himself, the next step is heat exhaustion. This is a more serious response to the heat and results in fatigue, weakness and collapse. An athlete suffering from heat exhaustion may have the following symptoms: normal temperature; pale, clammy skin; profuse sweating; nausea; headache and dizziness.

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Bill Starr recommends drinking more than six ounces of water for every 20 minutes of activity in warm weather.

Heat stroke represents the most serious heat illness because it can end in death. Every year, we all read reports of athletes, usually football players, taking part in two-a-days, who died from heat stroke. The symptoms include high body temperature; hot, red and dry skin; rapid, strong pulses; and in most cases unconsciousness.

All are preventable.

If You Can't Take the Heat ...

I had to learn how to deal with extreme heat at the very beginning of my quest to gain strength. My first duty base was at West Palm Beach in Florida, and the weight room, if it could be called that, was in a metal building with no fans or cross ventilation. When summer rolled in, it was difficult to breathe in the building, and I would be drenched in sweat by the time I did my warm-up set of leg raises. I was the only person to use the weights. Everyone else had better sense, but I was determined to be regular with my training regardless of how uncomfortable I was.

What I did when it got severely hot and humid was take salt tablets. This was what we gave the airmen who complained of heat exhaustion in the ER where I worked. Later on, I read they were of no value because they didn't dissolve fast enough, yet they kept me from cramping. I always took the salt tablets about an hour before I trained and drank a great deal of water to help dilute them. And because I only had an hour to train (the gym closed at 4 p.m., and if I wanted to lift, I had to do it during my lunch hour), the salt tablets were enough.

I also used salt tablets a few years later when I was roofing houses for my father-in-law in Wichita Falls, Texas. It would be hot as Hades, and my primary job was to lug the shingles up a ladder to the roof. I gulped water and ate salt tablets like candy the entire day and was able to have enough energy left to train at the YMCA after I got off work.

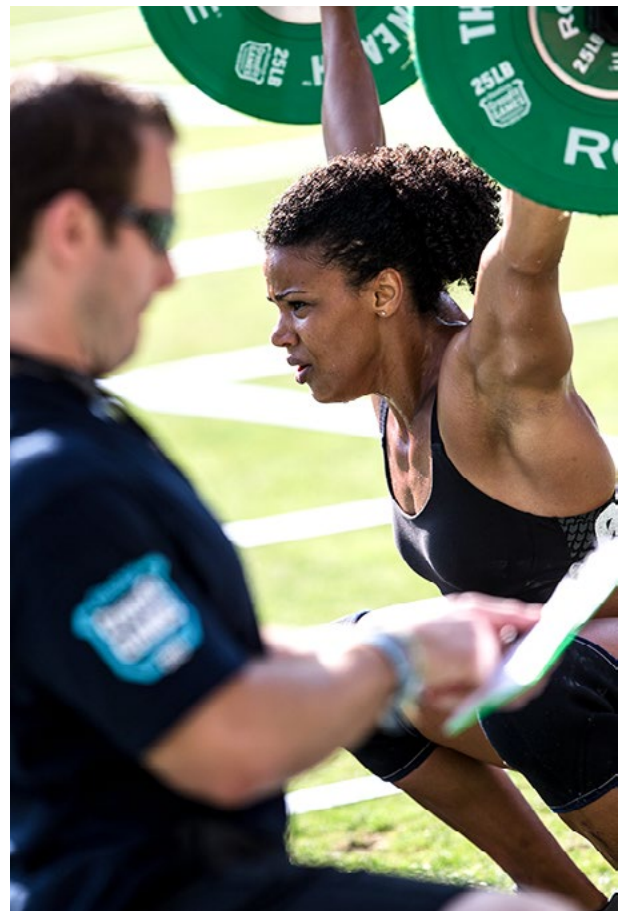
I don't, however, recommend salt tablets to my athletes. There are much better ways to deal with extreme heat. I didn't learn about minerals until I did my research for the nutritional section of *The Strongest Shall Survive* when I lived on Oahu. It was some of the most valuable information I ever came across, and I put it to use many, many times when I found myself having to train in an extremely hot gym.

Two places come to mind when I think about training in a sweltering weight room. During the summers when I was working at Johns Hopkins, I worked out in Sam Fielder's Shed on his dairy farm in the Northern part of Maryland.

Because I was the newest addition to the athletic staff, there was no money in the budget to pay me to coach the athletes who stayed in the area over the summer. The Shed was close by and free. It was a small, concrete building with a door and two small windows that seemed determined not to allow the slightest bit of air inside. On the days when the temperatures hit 100 degrees or more, it had to be 15 degrees hotter inside.

I never missed a session. Was it fun? Not by a long shot. Was it worth it? Absolutely, because I always made some progress and was able to hold onto whatever gains I had made in the winter and spring.

The second gym was even worse than the Shed. It was Billy Neel's combination gym and dive shop in Clute, Texas, right on the Gulf Coast. The gym part of the operation started out as a small collection of equipment for his younger



Staff/CrossFit Journal

You can't control the heat, but you can control the minerals and fluids you ingest pre- and post-workout.

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Competition is cutthroat at the elite level, and even slight dehydration can cost you seconds.

brother to use, but he kept adding more and more stuff and enlarged the workout space until he had the best gym in the area.

The biggest problem was that there was a swimming pool right next to the workout area where he taught scuba classes. When it got really hot, as it does in July and August, and the humidity levels equalled the temperatures, even the air-conditioned buildings were muggy. Billy's place did have a few fans, but with all the moisture rising out of the pool, the damp air felt like you were standing next to a furnace. The mirrors were always fogged over, and within minutes of being in the gym, your entire body was soaking wet. After someone finished his set, he would rush to the doorway and suck in some of the outside air, which was also hot but not as humid.

But they were hearty souls that trained at Billy's Gym. It was sort of a challenge to them to stick it out through the hottest parts of the year, and as a result they made considerable progress. Those who bailed slipped way back.

Billy's Gym and Fielder's Shed are what I call "three-T-shirt facilities," because that's how many T-shirts I would go through at every workout. Plus, I carried a towel to wipe the sweat off my hands and arms so that the chalk wouldn't turn into a messy paste when I used it. By the end of the session, the towel would be soaked as well.

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Starr's Supplement Recommendations

First, I'll go over what supplements you need to take in hot weather to allow you to get in a productive session, and then I'll provide some tips on programming.

Most people are well aware of the importance of drinking lots of water in hot weather, but few understand that water alone is not enough. In fact, drinking high volumes of water can actually create nutritional deficiencies. Whenever you're sweating profusely and gulping down lots of water, you're rapidly flushing the water-soluble vitamins and minerals out of your body—specifically, the B vitamins, vitamin C and all the minerals. Without an adequate supply of these vitamins and minerals, your body cannot function properly.

Most important are the minerals. Life itself depends on minerals. There are over 60 trillion cells in your body, and every one needs a wide array of minerals. Every cell is composed of five percent minerals. They are what propel and perpetuate the various metabolic processes as well as provide structure and support for the cells. When they are not supplied in adequate amounts, muscles cannot contract maximally, and there is a general feeling of fatigue. Early warning signs that you're deficient in minerals include cramps, muscle tremors, lightheadedness and extreme tiredness.

The other two water-soluble vitamins are also essential for a solid workout. The Bs help convert the foods you eat and drink into energy, so they are extremely valuable to anyone trying to get stronger. Vitamin C helps recovery and rebuilding. Of course, both do a great deal more than this, but a brief description is sufficient for the purpose of this article.

My point: if you want to have a good training session, make sure you take a generous amount of these water-soluble vitamins and minerals throughout your workout—especially the minerals. Take all the minerals together rather than separately because



Staff/CrossFit Journal

When competing in the heat, it's important to replace the vitamins and minerals you lose through perspiration.

Simple Shake

If the cost of commercial brands of protein powder is keeping you from making shakes, do what I do: buy dried milk solids. They can be found at grocery stores and cost a quarter of the price of the products at health-food stores. A carton of packets lasts me six weeks and runs right at US\$10.

The formula that I use is this: a half or full packet of dried milk, eight ounces of whole milk, a half cup of blueberry yogurt, and some ice cream. Sherbet also works. Don't throw in anything else, like fruit. It makes the shakes too thick. They need to go down easy.

One right after you finish your workout and another at bedtime will provide you with right at 100 grams of high-quality, easily assimilated protein, and they will do wonders to help you maintain your body weight and recover from the workouts.

they work together in a synergistic fashion. How many tablets should you take? It depends on how hot it is and how much you sweat, as well as your individual requirements. Everyone has different needs in this regard. What you must do is listen to your body. It will inform you when you should take a couple more multiple-mineral tablets.

The signal I need comes when my fingers start cramping. If I don't do something right away, I know my calves will be next. I've had sessions at Fielder's Shed when the heat and humidity were overwhelming and I had to take over two-dozen mineral tablets before my body would finally stop trying to cramp.

What you must do is listen to your body.

Load up on the Bs prior to training, about an hour before the workout. And eat a banana. The fruit will provide you with 400 mgs of potassium, the mineral most responsible for muscle contractions. Also take vitamin C before you lift, while you lift, and after the workout. It will help you recover from the exercises, and the faster you recover from any form of physical exertion, the better.

One other supplement that's very beneficial is a combination of calcium and magnesium. It will help you get to **sleep more easily** and stay asleep. Sleep problems are common during extremely hot weather, and those cal-mag tablets are a blessing. Be sure to check that the product contains twice as much calcium as magnesium or it will not be as effective.

Keep in mind that all these supplements are water soluble. You cannot overdose on them. If you take more than your body actually needs, the excess will be flushed out. You may waste a few cents, but in my opinion, I'd rather take too much than too little.

One of the problems that many athletes have during the hotter months is maintaining body weight. They have poor appetites, so they don't eat as well as they did when it was cooler. When body weight drops appreciably, so does strength. For those training to get ready for summer camp

in any sport, but particularly football, this is not the time to slip backward.

The solution: protein milkshakes—several a day. Drink one as soon as possible after your workout. It will do wonders for your recovery. Drink another at bedtime, along with some fruit or a peanut-butter sandwich. Those additional calories and protein will help you maintain your body weight and rebuild the muscle tissue that you've destroyed during your training session.

When Less Is More

Besides the nutritional support, there are other things you can do to help you get in a productive workout in extremely hot weather. Do what I did and carry several extra T-shirts. Change after you've done all the sets on an exercise. A dry T-shirt can make a huge difference between having a crummy set and an excellent one.

If possible, change your training time to early in the day or later in the evening to avoid the intense heat of midday.

Concentrate on working the large muscle groups and leave the smaller ones alone. You can bring them back into the routine when the weather cools off. Do three primary exercises for your shoulder girdle, back, and hips and legs, then leave the gym. It's often the hanging around for another 30-40 minutes working the arms that gets people in trouble in hot weather. That bit of extra work taps into the reserves and has a negative effect on the next workout.

By dropping all auxiliary exercises, you can cut your time in the gym by 20-30 minutes, and that will do wonders for your recovery.

Slow your pace. Don't push through your routine when it's extremely hot.

This is also a good time to alter your routine by doing lower reps. Nothing over 5 reps, and for the final sets, do doubles, triples and singles. Drop some of your warm-up exercises or only do half as many reps. There is really no reason to



Staff/CrossFit Journal

There's no need for a lengthy warm-up in hot weather—you're already warm.

spend 10 or 15 minutes going through a warm-up session in hot weather. In cool and cold weather, absolutely—but not when just strapping on your belt makes you sweat.

You can also drop some of the intermediate sets and go right to your work sets. Always put the most demanding exercise in your routine up front. That's when you're going to have the most energy. Slow your pace. Don't push through your routine when it's extremely hot. At Fielder's Shed, I would step outside after a set and walk over to the fence and watch the cows for a few minutes, then go back in and do my next set. That brief break did wonders.

All the while you should be paying attention to how your body is reacting to what you're doing, and keep supplying it with minerals and vitamin C.

As soon as you finish, drink a shake with more minerals, then try to lower your body temperature as quickly as you can. Getting under a cold shower or jumping in a pool will do. When I worked with the Baltimore Stallions of the Canadian Football League one summer at their training

camp at Towson University, the trainers had set up a terrific way for them to lower their core temperatures. In the shower room they had filled three large trash cans with ice and water. Thirty seconds in that frigid mixture and you had not only cooled off but you were also shivering. It worked great.

Mentioning my short stint with the Stallions brings to mind a question I'm always asked at clinics and coaches conventions. Can athletes still lift during two-a-days? Yes, they can, and that's what the players did at summer training camp. They practiced in the morning and late afternoon, then came directly to the weight room and lifted after both sessions. I had them do but one primary exercise after the morning practice. One day, an exercise for the upper body, the next day, one for the back, and finally a lift for the hips and legs. Five reps for 5 sets and they were done.

After the afternoon practices, they would do something for the smaller groups, such as calves, arms, midsection. Again, 1 or 2 sets, but the reps would be much higher—15 to 20 reps of exercises such as curls, presses, or standing

or flat presses with dumbbells. It was nothing strenuous, yet it allowed them to get in quite a bit of weight work because they were training six days a week. It helped them maintain the strength they had worked so hard to achieve leading into the camp and gave them a head start on their opponents at the beginning of the season. They won the Grey Cup that year. I'm not sure how much the weight training helped, but I am positive that it didn't hurt.

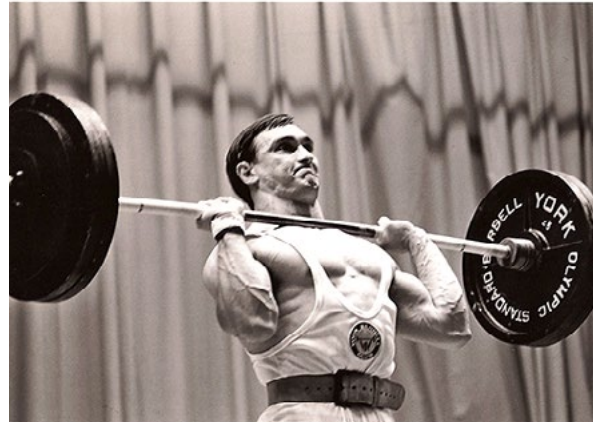
Train Smart

To summarize, if you pay attention to the small things, you can make progress during the brutally hot times of year. Carry lots of water. Robert Voy, the former chief medical officer at the U.S. Olympic Training Center, recommended six ounces of water for every 20 minutes of activity. Take a bit more just in case.

Put the bottles of vitamin C and B plus the multiple minerals in your gym bag so you'll have them if you need them.

Pack two or three extra T-shirts and fill a container with a protein shake. Condense your workout so you're only training for an hour or an hour and 15 minutes. Only work the larger groups and move at a slower pace than usual.

Getting stronger in hot weather is simply a matter of planning and making small adjustments to your program. Dealing with the heat can set you back, or you can overcome it just like any other challenge. It all depends on just how much you really want to get stronger.



Jody Forster

About the Author

*Bill Starr coached at the 1968 Olympics in Mexico City, the 1970 Olympic Weightlifting World Championship in Columbus, Ohio, and the 1975 World Powerlifting Championships in Birmingham, England. He was selected as head coach of the 1969 team that competed in the Tournament of Americas in Mayaguez, Puerto Rico, where the United States won the team title, making him the first active lifter to be head coach of an international Olympic weightlifting team. Starr is the author of the books **The Strongest Shall Survive: Strength Training for Football** and **Defying Gravity**, which can be found at [The Aasgaard Company Bookstore](#).*