

## HOW TO RUN THE BOSTON MARATHON by Mark Cucuzzella MD

As you enter the week prior to the race here are a few visualizations to help you set your plan. Running your best marathon is part art, science, guts, faith in what you can do, and a little luck. Running your best 10k is mostly about fitness.

I've had the pleasure of running this race 16 times with a string now of 10 consecutive. My only misses were for military and work duties and a foot surgery. In all these efforts had 5 under 2:30, 5 between 2:30 and 2:35; 2 between 2:35 and 2:40; 3 between 2:40-2:44; and one DNF ( first one with lots of rookie mistakes). My best learning experiences were when the men and women started together and I had the privilege of running alongside and witnessing the patient approach of the top ladies.

In the 1998 Fatuma Roba, the Marathon Gold Medalist in Atlanta and 3 time Boston winner, scooted over the ground with an incredibly efficient motion. Her knees stayed low, she lifted up her feet, arms relaxed, and face always relaxed. She stayed out of trouble by tucking behind the lead pack of more aggressive ladies. I followed behind the train and we hit half way in about 1:13. Fatuma then opened her stride up in the second half moving away from all of us to run a 2:23. An amazing second half effort. I was pleased with a 2:27 that day and credit Fatuma as any thoughts to go faster sooner were mitigated by her patience.

A few years later in 2001 I witnessed multiple world champion and Boston winner Catherine "the Great" Ndereba employ the same strategy. Her hydroplaning stride and complete relaxation of effort were a contrast to other ladies in the pack who's body language and breathing displayed they were putting out more energy than Katherine. As a group we hit the half in 1:14. Katherine stayed relaxed down the last set of downhill during mile 17 then tightened the screws with a huge acceleration over the Newton hills running a 50 minute last 10 miles for a 2:24. Katherine helped my day. By cueing off her pacing and relaxation I ran an even race and finished in 2:29.

The other runner who taught me to have fun out there was the legendary 3 time Boston winner Uta Pippig of Germany. In 1997 I ran with her until she dropped me at Cleveland Circle mile 22. The crowds loved Uta and the noise escalated as she approached. She smiled the whole way...this maybe her cue to relax, feed off the crowd's energy, and have fun in the moment. In marathoning you must be present in the moment, not thinking about how far you have to go, fearing what you may feel like later, are you going to slow down, when's the wall coming. Uta ran a strong fourth place that day in 2:28 and I finished a few strides back in 2:29.

All of these ladies made sure to get their fluid and nutrition at all stops. The seconds used here paid dividends down the road. They ran over the road not into the road, especially on the downhills...you could hardly hear them land as they did not employ hard heel striking technique. Their posture was tall and their arms always relaxed. But most vital was their efficient energy conservation and utilization strategy.

So how does this apply to you in your Boston Marathon, whether you are going to run 2:20 or 4 hours plus?

The best analogy I can think of is this: if you have trained your body properly with the right mix of aerobic level training and some up tempo stuff in recent weeks, you have built your efficient hybrid engine ready to race the marathon. Many of you have driven in a Prius and watch the subtle shifts between gas and electric on the screen. You do not perceive these shifts. Your engine runs on gas, electric, or a mix- depending on the effort.

You are starting the race with one gallon in the tank- assuming you have eaten a nice meal the night before with a breakfast top off.

- If you are in all gas mode, your engine will run about 1.5 hours at a strong pace.... then you are out of gas.
- If you are mostly electric you can run all day, but maybe maybe not so quickly.
- If you are using the proper mix you will go quick and efficient for duration of your event, and you can even do some topping off along the way.



The glucose utilizing pathway is the gas. This is your stored glycogen and blood glucose (pasta meal and breakfast) - easy to access for ready energy. The fat utilizing pathway is the electric. In marathons you must be in hybrid until the last few miles. Hybrid is where your energy (ATP) is coming from both sources.

Many runners are in great "10k shape" (an all gas event), then run their marathon in the gas mode- and usually crash. No glycogen sparing factors apply in races of less than an hour as long as you had a good pre-event meal to fill the tank. In marathons and ultras- top end fitness matters little and can only be applied very near the finish. Glucose gives 36 ATP per molecule, fat 460 ATP per molecule. Now you know how a bird can migrate 7000 miles without a Powerbar.

So how do you know you are running in your best hybrid mode?

This is difficult because the sense is not as profound as aerobic/anaerobic. A slight increase from your optimal pace will switch you from hybrid to all gas without you realizing it, and the effects are felt miles later. Charging up hills early will tap your gas quickly. Maintain effort not speed.

You must rehearse a bit in training. I focus on relaxation and breathing. If I'm breathing one cycle to 5 steps, then I'm hybrid. Any faster I'm using glucose as sole fuel. Belly breathe- allow lower belly to blow up like a beach ball on inhalation and pull your belly button back to your spine on exhalation. Then you will fill the lower lung areas where oxygen exchange occurs.

Notice the breathing efforts of those around you and many are rapid breathing- they tend to suffer somewhere past half way. Rehearse complete relaxation from the top down- eyes, jaw, shoulders, allow your legs to relax and extend behind you, relax and soften your knees and ankles. Find your own cue for this. If you use the Heart Rate Monitor in training strongly consider one during the event.

In a marathon, the last 3-4 miles you will be all gas to maintain the same speed as fatigue sets in. The breathing is usually on a 3 to 4 step per breath cycle- that is OK. Still stay relaxed and use some relaxation cues that you have rehearsed to keep your form.

Land softly, especially on the early downhills. I use a running method called ChiRunning which focuses on midfoot strike, slight forward lean, and letting gravity do some of the work. A few months after learning this technique I ran a 2:31 here at age 39 and felt none of the usual post Boston soreness. Felt so good I lined up 5 weeks later in Ottawa for another 2:32. I'm never sore after marathons now thanks to ChiRunning and feel I can keep doing them until I enter the retirement home. No pain...thank you.

Your shoes matter too. Not that you are going to change your shoes in the next day based on my advice... but make strong consideration to not running in minimalist racers unless you have trained substantially in them. Your body will need some protection on the downs to save muscle fiber for the later rolling sections. My favorite shoe is the Newton Neutral Racer, an incredible marathon shoe if you are running with a proper midfoot landing. If you relax your lower legs and not push off...these shoes with no heel elevation put you in perfect position to allow natural elastic recoil of plantar fascia, Achilles, calf muscles, and hip flexors. Try to learn the midfoot strike and test the Newtons before Boston 2011. Read Dean Karnazes new book "50-50" (50 Marathons, 50 States, 50 Days). He has figured this gait efficiency technique to and it has allowed him to accomplish some amazing endurance and durability feats. "Born to Run" also makes the case for running with a more efficient stride and questions modern running footwear. The evolving world of modern sports medicine is going back to the future too and rediscovering what evolution has taught us. For an all inclusive document go the [www.freedomrun.org](http://www.freedomrun.org) and click "download presentation" from the homepage.

Now a few extra ways to get from start to finish quicker on the same gallon.

- If you can add a little gas along the way then you can go more into gas mode. This works a little at best. If running too fast you shunt all blood to working muscles and nothing digests. If you are in hybrid the early going you can continually add fuel- the key is not only the correct fuel, but the right pace. A Powergel every 25 minutes is easy to digest and tops off the tank. Carry them with you at the start. The weight is nothing compared to the benefit you will get. If you do the gels then you can drink water instead of the energy drinks which are often less predictable on the run. Boston has a Powergel station at Mile 17. Carry 4 at the start (one every 4 miles or so) and reload at mile 17.
- Maintain effort on uphill. Your pace will slow. You can easily use all your gas here if your effort increases. Shorten your stride, relax, and use your arms. Then allow gravity to take you down.



- If you are having a “bad patch” – try to refocus on relaxing, fuel a bit (sometimes a blood glucose drop triggers the sense of doom) , and have faith in your training and race plan. Another nice trick is when you hit mile 21 it is not 5 miles to go, it is 4 and change. Mile 22 is 3 and change to go. Just run to the next mile marker.

The fun of the marathon is that we are always learning and enjoying the adventure of it. I've done over 50 marathons now with a couple under 2:25 in my younger years. I've had one DNF at my first Boston in 1989. I raced the first half in 1:08 in gas mode not realizing it, in really minimal shoes that I'd not trained in, and was done by 20 miles. My worst time of the all the others has been a 2:44 at “run for hoses” Boston on 2005- 90 degrees and sunny. No hybrid here as efforts to cool were overwhelming. Another slow day was a 2:41 in the “run for cover” Boston in 2007. This was year with 30 mph headwind and Nor'easter rain. I was not in hybrid in this race in efforts to fight wind and cold, hit half way in 1:16, and suffered coming home.

We learn from experience, taking chances, and occasional failures. My first marathon in 1988 was 2:34. This year (22 years later) I hope for a similar time (2:37 in 2009 race with some tough winds coming in). Along the way I've accumulated 20 straight years under 2:35 except for my year of medical internship when there was no time to find a race. I've learned a few things in 20 years, but still there are uncertainties every time you line up. Relax, taper up, and seize the day.

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