

JAPAN'S KARUIZAWA HALF MARATHON

STRAVA SAFETY

CANADIAN

Running

PAIN

Why

Running
Sometimes
Hurts



HOT WEATHER GEAR

The Season's
Coolest Looks

How Your
PERSONALITY
Could Affect
Your Running
PERFORMANCE

Understanding



By Molly Hurford

Some runners love getting to that point in a race where they're in pain. That burn or ache is a signal that they're at their maximum capacity, giving it all they've got. Other runners feel those first shocks of pain hit their hamstrings and instantly dial down their effort, assuming they have pushed too hard and are in trouble, possibly moments away from sustaining an injury.

Both of these tactics make sense. As runners, we've been taught to expect pain, even to glorify it. But as biological humans, we instinctively shy away from pain and discomfort. Pain can be any of three things: an important warning sign, good mid-run information, or our brain's way of tricking us into slowing down, for no good reason.

Pain is both more complicated and more nuanced than a simple "ouch." We spoke to neuroscientists, mental performance experts, pain researchers, physiotherapists and athletes to get to the bottom of the brain and body's complex relationship with it—and what we learned will not only help you keep going, but it has the potential to help you in every area of your life.

Understanding pain

When people say pain is all in your head, they're not wrong. "We believe the brain is required to create an experience of pain," says Dr. Massieh Moayed, a world-leading pain expert and director of the University of Toronto's Centre for Multimodal Sensorimotor and Pain Research. The brain perceives pain when it receives nociceptive signals, which happen when certain receptors detect pain-inducing damage or simply believe that damage is imminent.

Because pain is perceived, everyone experiences it differently, the same way we hear music differently. Some people hear opera and are transported. Others hear it and think it sounds like shrieking cats. That's why, for some people, a blister feels like a 10 out of 10 on your performance.

But for others, a pain scale, while others will ignore the pain of a fractured foot bone over a 12-mile mountain pass in a 100-mile race.

So, regarding your burning quads as you run down a hill at kilometre 16 of a half-marathon: your pain is real, but it doesn't necessarily mean you're injured, or that you should stop. "Pain doesn't encode injury," says Moayed. "It encodes the *threat* of injury or potential harm. Your alarm system is trying to protect you, so it'll often kick in before injury, so you can change the behaviour to mitigate harm." That's why you feel like stopping when it hurts, when (more often than not) your brain is stopping you long before your legs actually need you to stop.

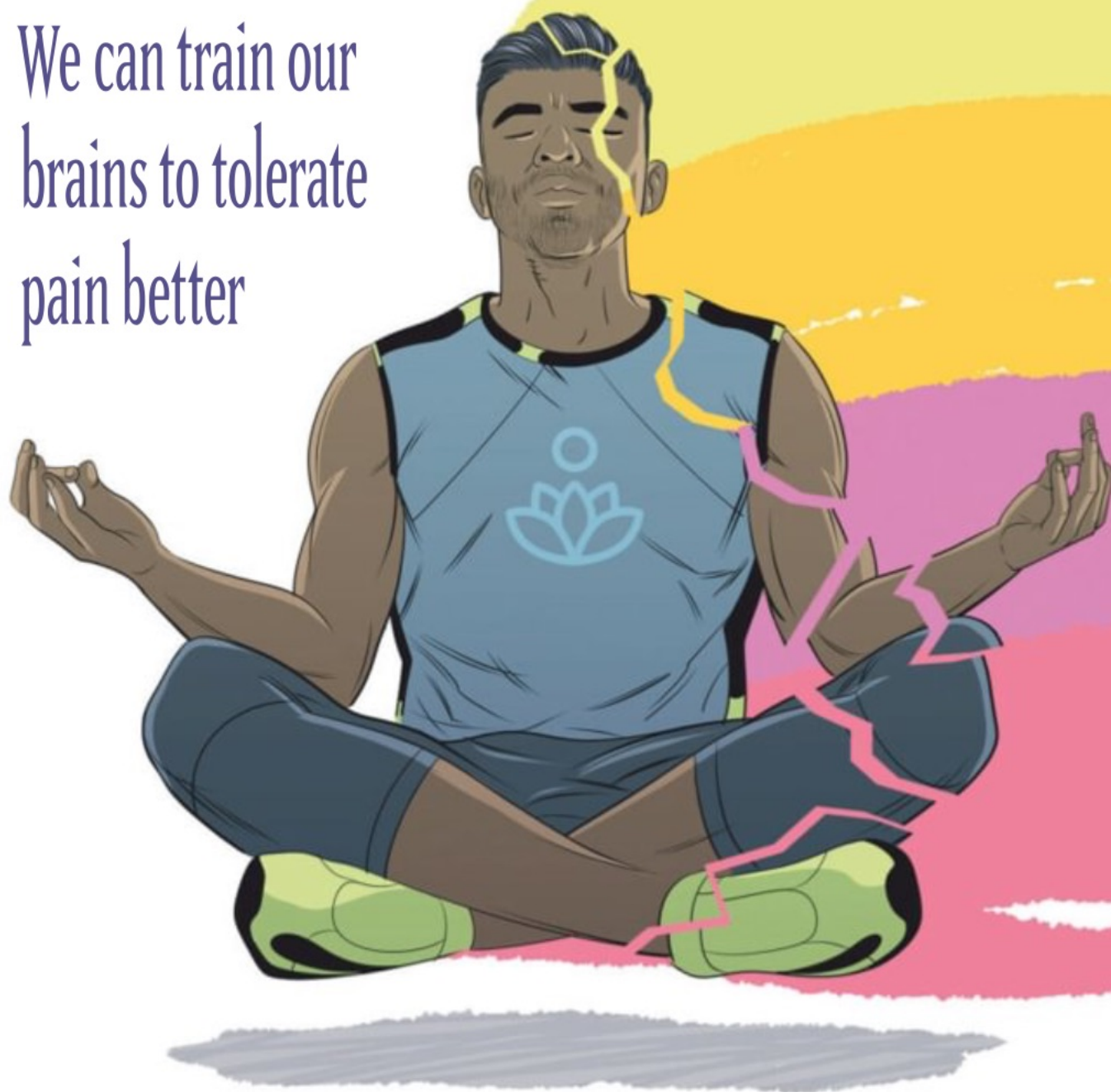
"Humans naturally avoid effort," says Samuele Marcora, professor of sport science at the University of Bologna. "If you have a way to gain a reward with less effort versus more effort, you typically choose less. It's a very strong law of behaviour. But at the same time, effort also gives value to the reward. And a reward earned with less effort may not feel as meaningful."

Marcora is one of the foremost experts on endurance athletes and fatigue, pain and what stops us from going farther, faster. His research has found that the perception of effort, rather than severe muscle fatigue or pain, is actually what most often stops us. Essentially, it's your brain telling you you're tired and in pain that's slowing you down, not what is actually happening to your body. If your brain would just shut up, you could keep going.

"Perception of effort is affected by muscle fatigue, but also by many other things," Marcora explains. "Actual muscle damage is just one of many things that can affect perception of effort. But so is mental fatigue."

"A lot of people think pain directly limits your performance," says Marcora. "And if you break an ankle, then yes, of course it does. But the pain didn't limit you; the injury did."

We can train our brains to tolerate pain better



did. Exercise-induced pain—the burning or aching sensation in your muscles—doesn't have to limit your performance. Being in pain will, however, increase your perception of effort, and *that* can limit your performance.”

Your performance, and how you deal with pain

A decade ago, a friend who is a professional cyclist said something that blew my mind. At the time, I was bemoaning painful cramps in my quads during and after a long run. “I’m always happy when I cramp in a race or a workout,” he told me. “It means I’m working as hard as I can, and I’m at my limit.” I thought about that statement as I talked with Marcora about what feeling pain during a workout signifies, and how much attention we should pay to those signals.

Where training and racing are concerned, there is some truth to the old cliché of “no pain, no gain.” If you stopped running every time you felt that first hint of aching or burning, you’d almost certainly be stopping long before you’re at risk of injury, and you could be hampering your ability to get faster and stronger.

And it is true that some people are better able to withstand pain than others. Marcora believes it’s a big part of what separates the top of the field in a race from the rest. Top performers tolerate, or even welcome, it. I joked with every researcher I spoke to that, in the ultra world, there are two types of finishers: those who cross the line looking exhausted and collapsing in pain, and those who finish with a smile, chatting with friends and walking away to get changed and find a snack. In my experience, the ones who are smiling are usually women.

The researchers aren’t surprised to hear this. Moayedil explains that, while females have a lower pain *threshold*—meaning if they’re poked with a pin at the same intensity as a male, they’re more likely to ignore.

it as painful—they also have a higher pain *tolerance*, meaning they’ll cope with that aching and burning for longer.

This high pain tolerance may be why women tend to excel in longer races; that’s what Marcora believes. They’re better at withstanding the pain signals that are unavoidable 15 hours into a 100-miler. And this may explain why, at many ultramarathons, including the Leadville 100, a higher percentage of women than men finish the race.

But how do you push through the pain, and is it possible to harness it to boost your performance? As it turns out, we can train our brains to tolerate pain.

Assessing the situation

Running through pain isn’t the same thing as running through injury, and these tips only apply to the burning, soreness or ache in your muscles that comes when you’re working hard. Pain from an actual injury can’t be “thought away,” says Jenn Tadashore, a Collingwood, Ont.-based physiotherapist.

“If the pain you’re experiencing is sharp and localized and doesn’t resolve by slowing down or stopping, or if that pain starts or continues after your run, that’s a sign that you’re dealing with an injury, and not just the pain that’s part of pushing your limits in a race or workout,” Tadashore says. She adds that if pain causes you to change your running form, that’s also a sign of something brewing, and you should pause your run and get it checked out.

Canadian sprinter Micha Powell adds, “You have to get to a point where you trust yourself to know your body and your own cues.” An occasional twinge is likely not cause for concern, but pain in your Achilles tendon that flares every time you run isn’t something you



Take a (mental) load off

To quote Albus Dumbledore in *Harry Potter and the Deathly Hallows*, “Of course it is happening inside your head, Harry, but why on earth should that mean that it is not real?” Some people dismiss pain as being “all in your head.” But what’s in your head can change your physiology.

Take stress, for example. Moayeddi explains that functioning in a state of high stress (whether from work, life or training) is possible, but doing that for any length of time can lead to really poor health outcomes, such as higher inflammatory markers and higher cortisol in the blood. The stress in your mind is directly impacting your immune and stress responses in the body.

Because of this phenomenon, Marcora says lowering your stress in the week leading up to your race may be the most beneficial thing you can do to improve your body’s response to pain. This can even be true of hard workout days; don’t schedule intervals right after a potentially stressful event (your quarterly evaluation with your boss, for example). The higher your overall stress, the faster you’ll start to feel those signs of fatigue and pain.

You can also reduce that mental load during your race. “We know mental fatigue increases perception of effort and reduces performance,” says Marcora. “Anticipate what could go wrong during the race, and think about what you will do if that scenario happens. That will reduce your mental workload during the competition.”

Ask yourself: what’s the story?

Lorenda Beuker is a former Team Canada athlete and director of mindset and team success at Keiser University in North Palm Beach, Fla. When you’re feeling pain in a run, Beuker suggests questioning your feelings, as in, “What story am I telling myself?”

Often, the negative emotions that bubble up on a run at the first hint of trouble are more damaging than the pain signals themselves, she says. We feel our calves burn, and we instantly assume we didn’t train enough, that we’re bad runners, that we’ve torn a muscle and will need months of physiotherapy before we can walk again—you know how it goes. More often than not, the situation isn’t that dire, but, Beuker says, our brains love to spin out of control. If you can start to observe these thoughts and stories, you’re able to remove yourself from them, and to question whether they’re true.

Get distracted

The longer you’re out there, the greater your mental fatigue, says Marcora, and the greater your perception of effort and of pain. That’s why so many ultrarunners listen to music or audiobooks when they run: they’re distracting themselves. And it works.

“When I’m in the race and feeling that burning sensation, I’m not thinking about it, I’m thinking about performance cues like ‘tall hips,’” adds Powell. “You just can’t let the doubt settle in.”

Beuker adds that another way to distract yourself is to acknowledge those negative thoughts and emotions, but then focus on the feeling you want to have in the moment. “You’re panicking about your hamstrings aching? OK: what’s the opposite of panic? Feeling capable. Feeling calm. Even that simple act of self-talk can allow you to feel like the author of your emotions, and that makes a big difference.”

Train better

Another good news/bad news tip: “There’s not much you can do to reduce pain during competition, apart from training,” says Marcora. “Unfortunately, painkillers don’t work well for exercise-induced muscle pain. So the best thing is to train so that you don’t get so much pain when you repeat the same kind of effort.”

Beuker adds that when you do feel those negative emotions around pain, it’s important to re-examine them later, and not sweep them under the rug. “Maybe you feel guilt and shame because you know you didn’t train to the best of your abilities, and that’s why you’re feeling so bad when your muscles are burning,” she says. “Save that feeling for later, and use it to train smarter for the next one.”

That said, pain doesn’t necessarily go away as you get fitter; you just don’t hit the pain wall as easily. Someone who runs a five-hour marathon will likely feel the same amount of pain as someone running a three-hour marathon, assuming both have trained appropriately and are both racing at a perceived effort of eight out of 10.

Placebo yourself

This is where the brain gets wacky. Moayeddi explains that the placebo effect is so strong that, even if you know something is a placebo (i.e. completely inert), it can still work. He describes a study in which two groups of participants applied a skin cream before rating their pain from applied heat; one group was told the cream was a painkiller, and the other that it was just lotion. The group that thought it was a painkiller reported less pain, showing that when people merely thought that a lotion was a painkiller, the brain reacted as though it was. In another study, participants were told the cream only *looked* like a strong painkiller but was actually a placebo (which was true), and even *that* cream had a painkilling effect. The powerful placebo effect has been demonstrated in thousands of studies.

So, consider labelling one of your lotions “painkiller” and using it before long or hard workouts, and see if you can trick yourself. If you want to believe in something, your brain will try to make it true in seemingly magical ways.

Accept the pain

“In a race, you can prepare yourself mentally by saying, ‘I know what I’m getting into,’” says Moayeddi. “I know this pain is normal. I know my muscles are fatigued. I just have to push through this.’ This is mindful exercise, where you’re aware of the signals of your body, but you’re able to disengage from them and focus on the goal.”

Or, as Powell says, “You have to keep reminding yourself that ultimately, we are not on this spinning chunk of rock for very long, and you want to finish your race or your workout knowing you gave it your best shot.”

You can also remind yourself that the pain you’re feeling in a workout or a race isn’t forever—even though it may feel that way. “Pretty soon, you’ll be done, and you can snuggle your dog, or hug your kid, or just lie on the couch and watch a show,” adds Powell. “You’ll get to come home and be proud of what you did.” 

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