

Biomimicry and Nasa's cooling technologies are the new frontier in sports rehabilitation

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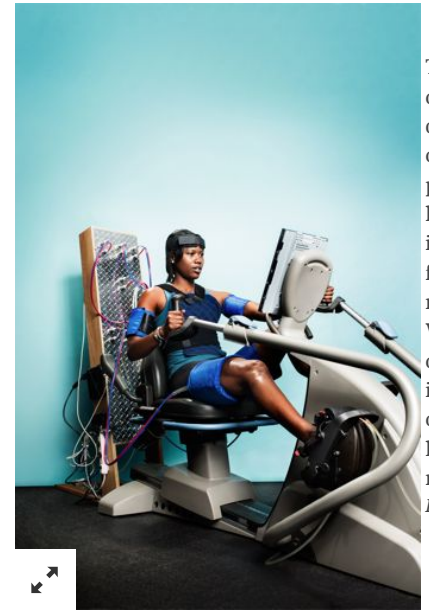
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In the heart of Silicon Valley, at Nasa Ames Research Park in Mountain View, California, in an unassuming one-storey building, Peter Wasowski believes he can transform fitness regimes, and in the process heal both bodies and minds.



The rear controls distribute coolant to pads, which increase blood flow and metabolic rate. Vascular compression increases lactic acid concentration in muscles (Pickens)

Combining cooling and compression pads that hold blood in the upper arms and thighs, his Vasper (<http://vasper.com/>) (short for vascular performance) fitness system fools the brain into thinking it has been working flat-out for several hours, when in fact it has only been exercising for 20 minutes. It sounds like an infomercial for an abs machine that promises the Earth for little effort, but Wasowski's team has been getting startling results -- as have high-profile test subjects such as US Olympic athlete Erica Ashley McLain (pictured), who used the system to recover from a serious ankle injury.

The concept is to biomimic the physiology of children.

"Watch a child and you do not see them walk -- they move quickly, they play and expend a tremendous amount of energy," says Wasowski. "If you were to look inside their muscles you would see high concentrations of lactic acid, and the higher the concentration, the stronger the feedback to the brain requesting growth hormones and other anabolic hormones, such as DHEA, IGF1 and testosterone, which rebuild damaged tissues."

Once humans reach puberty, the body, being much bigger, can no longer concentrate lactic acid at previous levels. At the same time, metabolic rate slows along with the growth process. "So every ten years after puberty, we lose 14 percent of what we call endogenous growth hormone release." According to Wasowski, a 16-year-old athlete is already running at 86 percent of growth hormone, not 100 -- and this slows recovery. By contrast, a footballer with an injured knee given six to ten weeks to recover completely can, supposedly, hit the Vasper machines and be match-fit in two weeks.

"We concentrate the lactic acid in the quads and biceps, and we fool the brain into believing that the athlete has just run up a 600-metre-high mountain, and all those muscles are damaged. So the brain releases massive amounts of endogenous hormones to rebuild the muscle tissue, and anything else that requires repair gets repaired, just like it would with a small child."



After an open dislocation of her ankle during a training accident in 2011, The Vasper machine sped up Ashley McLain's recovery *Cody Pickens*

Along with this biomimicry (<http://www.wired.co.uk/photos/wired-things/2010-01/20/biomimicry>), Vasper relies on cooling technology modelled on Nasa spacesuits to aid healing and performance. Wasowski explains: "If you were to take a bowl of water and heat it over a flame, you would see it starting to warm up and oxygen coming out of it. The same thing happens to the bloodstream. As your body temperature goes up, the blood temperature increases and starts releasing blood oxygen. The less of that oxygen you have on board, the more you start gasping for air. You hit the wall, or the 'O2 max' -- the ability of the body to metabolise oxygen. And that's when your performance goes south."

Wasowski says that in swimming, as blood has much higher blood-oxygen volumes because the temperature is cooler, this type of exercise burns 45 percent more fat as the body is giving maximum fuel to the muscles and running at a much higher efficiency.

"We're duplicating that scenario out of the water," he states. "We have a temperature gradient, between 4.5 degrees celsius and 12 degrees celsius, where we cool the chest, head and feet. So during a 20-minute session you get the benefit of a two-and-a-half-hour workout."

These ultra-efficient workout sessions have generated some compelling improvements in performance: "We had a triathlete here who did only ten sessions. Then she flew to Hawaii and did an Iron Man race. After those ten sessions, she took 50 minutes off her race time -- 50 minutes."

Vasper is also working on a special programme with US Navy Seals to explore the benefits of the system for troop training. The US Navy refused to comment, but, particularly in this area, Wasowski has noted extraordinary mental rewards using the equipment.

"There are tremendous issues with post-traumatic stress syndrome in the military. And this technology works very well to help those soldiers regain their mental balance, because hormonal balance has a very close relationship to mental balance. We've seen amazing turnarounds with people close to being suicidal who were fine after doing this therapy."

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Wasowski expects to have data published on Vasper this year from studies conducted by the Navy Seals, the University of Hawaii and an additional base setting up next month at University of California, San Francisco. For now, he offers himself as further evidence of Vasper's efficacy, having used it to rid himself of arthritic pain in both ankles. He now takes no arthritis medication whatsoever.

"People say, 'This must be a dream come true.' But it's beyond a dream."



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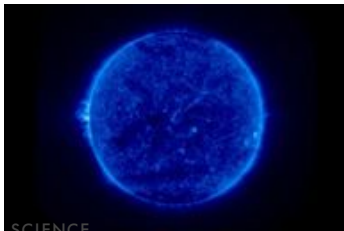
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