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KAATSU—THE ORIGINAL BFR—IN THE NEWS

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KAATSU—THE ORIGINAL BFR—IN THE NEWS

(a paperback adaptation of KAATSU Magazine, Volume III, Issue 7)

By Steven Munatones for KAATSU Global, Inc.
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KAATSU—THE ORIGINAL BFR—IN THE NEWS

THE LETTER FROM THE EDITOR

The 2020 Tokyo Olympics were the most unusual, unpredictable, unique Games in history. But the eyes of the sporting world were cast upon the participating athletes on television, smartphones, laptops and media. Their stories, triumphs and disappointments were fascinating to learn about and learn from.

These athletes push themselves faster and harder than most humans in search of Olympic glory. But they are also always searching for better, more effective and more efficient ways to prepare and train their bodies and minds.

One modality that Olympic athletes use is KAATSU. Used among athletes worldwide, including gold medalists, it is both innovative and gentle on the body.

This is one of the many reasons why KAATSU is used by non-Olympic athletes from schoolteachers and office workers to people with musculoskeletal injuries and those dealing with carpal tunnel syndrome, multiple sclerosis and cerebral palsy.

This KAATSU Magazine highlights some of the media attention that KAATSU has generated, written by independently minded reporters.

Enjoy the journey.

Steven Munatones

Steven Munatones, CEO & Co-founder
KAATSU Global, Inc.
Huntington Beach, California
U.S.A.

KAATSU EQUIPMENT

DO

- Correctly place the KAATSU Air Bands on your upper arms and upper legs every time.
  - Note : On your arms, the Bands should be placed above your biceps and triceps near your armpit, but below your deltoids.
- Check Base SKU (pressure) and find Optimal SKU (pressure) during every KAATSU session. Optimal Pressure is one that is not so high as to occlude, but high enough to get that “KAATSU Fatigue/Failure Feeling” during exercise.
  - Note: Your Optimal SKU can change on a daily basis.
- Release the KAATSU Air Bands if you feel something is not right. If you feel lightheaded or if you have any pain on one side or the other, stop and continue on another day.
- You can do different exercises or movements during KAATSU. You can type emails or play the piano or play computer games. Be creative and enjoy the experience.
- Rest 30-60 seconds between different sets of exercises.

DON’T

- Do not ever fully occlude blood flow. Signs of this are collapsed veins, no pulse at the wrist, pale palms and skin, severely delayed (>6 seconds) capillary refill.
- In the untethered mode, do not have the air bands inflated for more than 20 minutes on your limbs
- Do not lift heavy weights when doing KAATSU

Why kaatsu, a fitness trend spotted at the Games, isn't just for Olympians

CNN health

By Kristen Rogers, CNN

Pictured are current Olympians Galen Rupp (left) and Michael Andrew (right), and past Olympian Mikaela Shiffrin (middle).

Restricting your blood flow sounds like a dangerous thing to do, but it's exactly what some Olympians, athletes, and surgery and physical therapy patients have done to strengthen their muscles and speed up recovery.

The origins of this practice go back to 1966, when -- while sitting on his heels during a Japanese temple ceremony -- Yoshiaki Sato noticed his calves felt tingly and pumped up. Sato wondered if his limited blood flow was the key to experiencing that sensation, said Steven Munatones, the CEO of KAATSU, an eponymous blood flow restriction product and education company. Munatones cofounded KAATSU Global -- which translates to "additional pressure" in English -- with Sato in 2014 after being mentored by him about the Kaatsu technique for 13 years in Japan.

Seven years after that initial tingly feeling, Sato "experimented with different kinds of bands placed on

> The consensus among these experts is that using blood flow restriction two to four times a week is required for results to occur.

different locations on his body -- from his head to his torso to his lower legs," Munatones said via email. "In 1973, he experienced a broken ankle and rehabilitated himself using KAATSU."

This was the first experimentation with KAATSU cycle mode, Munatones added, which is when bands with internal "air bladders" are inflated for 30 seconds as the bands compress around upper limbs, then deflate for five seconds before repeating the cycle. This rhythmic compression slows the blood flow back to the heart and therefore allows the veins and capillaries in the treated areas to engorge with blood -- visible as the skin gradually reddens -- while you're exercising, Munatones said.

This engorgement expedites several naturally occurring biochemical reactions, such as secreting nitric oxide, human growth hormone, insulin growth factor-1 and beta endorphins, all of which have differential roles in increasing blood supply, preventing tissue damage, regulating body composition and muscle growth, growing bone and tissue, and suppressing pain.

"Individuals exercise during the application of BFR to improve muscle mass, muscle strength, reduce pain, improve recovery, increase cardiovascular capacity and augment sports performance," said physical therapist Nicholas Rolnick via email.

Since Sato's discovery and subsequent studies on thousands of people, athletes, fitness enthusiasts and Olympians -- including long-distance runner Galen Rupp, diver Laura Wilkinson, swimmer Michael Andrew and alpine skier Mikaela Shiffrin -- have benefited from the technique. But you don't have to be an athlete to use Kaatsu or blood flow restriction training -- here's what experts say you should know before you try it.

How it works

When someone exercises while practicing Kaatsu or blood flow restriction, blood and metabolic byproducts are "stuck in the muscle, unable to leave," Rolnick said.

"The metabolites increase muscle fatigue, causing the muscle to work much harder than it normally would to produce a contraction at light loads," he added. "We have to work very hard to keep up with the exercise and that extra effort, paired with the fatigue produced through the BFR, accelerates muscle mass and strength gains."

Muscle fibers required to perform high-intensity actions -- such as jumping, throwing, lifting weights or kicking -- are recruited at lower intensities than usually required, said Stephen Patterson, a professor in applied exercise physiology and performance at St Mary's University, London, via email. That means someone could lift 20% to 30% of their maximum weight instead of the usual 70% or greater, and still experience a response like that of training with heavier loads, he added.

Need-to-knows before attempting BFR

People these experts have sold related products to, treated or studied include athletes of nearly all levels of ability, people who lead sedentary lifestyles, and those recovering from injuries, and range from 18 years old to 104.

The ability to use much lower loads when blood flow restriction training to build muscle and

increase strength "is especially beneficial for those who are injured or have other conditions that do not allow them to either lift heavy or perform high intensity aerobic exercise," Patterson said. This includes people who have recently had surgery or are paraplegic or quadriplegic.

"Major problems in the rehabilitation setting are the inability for patients to effectively strength train due to an injury or post-surgical precautions as well as pain," Rolnick said. "The growth of BFR training allows those individuals who would be unable to challenge their bodies under normal circumstances a chance to build more strength and muscle mass during times where it would be near impossible."

If you have just had surgery and have large incisions with stitches and you want to practice Kaatsu immediately, talk to your doctor first, Munatones said. "The reason why is because the incision will dramatically heal much, much faster than normal and their skin can grow very quickly over their stitches - which usually surprises orthopedic surgeons how quickly the body recovers using KAATSU."

Groups for whom blood flow restriction might not be appropriate include people with hypertension, uncontrolled diabetes, obesity, kidney disease, arterial calcification, a history of blood clots and medications or conditions causing higher risk of clotting, venous thromboembolism, vascular diseases, sickle cell anemia, cancer, poor circulatory systems or open fracture, these experts said.

Potential side effects have included lightheadedness, tiny red spots on arms, bruising near the equipment, feelings of pins and needles, and nerve damage, some of which can be avoided by properly practicing blood flow restriction.

Contact your doctor before trying this type of training, or if you experience these or other negative side effects.

How to practice the technique

Regarding equipment, Patterson recommended using medical grade-type products that will give you a reading to ensure the pressures advertised are true. "Exercise bands and other material etc. may be able to restrict blood flow but from a safety perspective there is no idea what level of restriction you are applying," he wrote via email. That could limit adaptations and responses or cause injury.

"There are many cuffs on the market but my line in the sand is a pneumatic cuff that can be inflated either automatically or manually (like a blood pressure cuff)," Rolnick said. "Each of these types of cuffs can carefully measure the amount of blood is restricted to increase safety profile. This is very important because as BFR continues to grow, more cuffs are going to enter the marketplace that may not be adequate or appropriate."

Rolnick and Patterson advised anyone starting out with blood flow restriction to work and train with trusted practitioners to determine what cuffs would be consistent with your goals -- and to understand how and when to use this type of training. Otherwise, Rolnick added, you could be at higher risk of experiencing a negative outcome -- especially since an ordinary exercise band can't measure how much pressure you're applying.

You can expect burning sensations or soreness during or after the first couple of sessions, but these generally subside by the third session, said Hunter Bennett, a lecturer in exercise science at the University of South Australia, via email.

Once you inflate the cuff, you could practice blood flow restriction by alternating repetitions and rest while training your preferred muscle group, Bennett said.

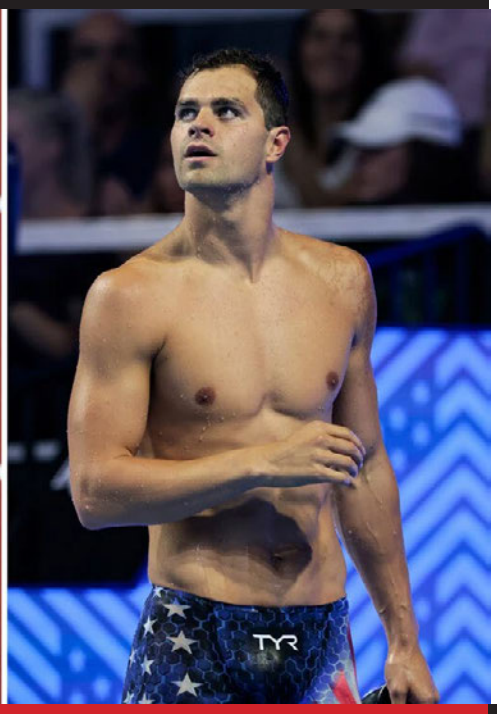
The consensus among these experts is that using blood flow restriction two to four times a week is required for results to occur.

A HOT FITNESS TREND AMONG OLYMPIANS: BLOOD FLOW RESTRICTION

The New York Times

By Matthew Futterman

Some athletes in Tokyo are indulging in a trendy technique to enhance the effects of training and stimulate recovery. Credit a Japanese former power lifter.



Galen Rupp, left, and Michael Andrew both use blood flow restriction when training.Credit...Cliff Hawkins/Getty Images; Hiroko Masuike/The New York Times

Every four years, the Summer Olympics shows the world the latest training or recovery method the greatest athletes have taken up.

In 2016, many swimmers had red circular marks on their skin from "cupping," an ancient Chinese practice involving suction on sore muscles and tendons.

This year, the hot thing appears to be tourniquets.

No, there is no outbreak of cuts. But the American swimmer Michael Andrew is wearing tourniquet-like bands in the practice pool. Galen Rupp, the defending bronze medalist in the marathon, sometimes straps similar bands to his legs while training.

They are among the elite athletes who have become disciples of a practice known as blood flow restriction, which is exactly what it sounds like: cutting off blood flow to certain muscles for limited periods to both enhance the effects of training and stimulate recovery.

The practice has come into vogue in time for the Tokyo Games, and a Japanese former power lifter named Yoshiaki Sato, who developed it in 1966, is finally having his moment.

Sato, 73, has been honing the technique and spreading its gospel for most of his adult life, building a small fortune in the process as a Japanese version of Jack LaLanne. He has created a practice and a series of products called Kaatsu that are geared toward

blood flow restriction. Sato still practices blood flow restriction every day, and now marvels at the attention it is getting.

"It was always just a matter of time," he said this month in an interview from his home in Fuchu, a suburb of Tokyo. "I just did not think it would take this long."

In recent years, blood flow restriction gained an important advocate across the Pacific in Dr. Jim Stray-Gundersen, a physician and sports medicine researcher who has worked closely with Olympic organizations in the United States and in Norway.

He essentially created the "live high, train low" approach to altitude training, which prescribes athletes sleeping and living above 8,000 feet to increase the production of oxygen-carrying red blood cells, then descending a few thousand feet to train in order to avoid overtaxing the body.

Stray-Gundersen trained with Sato earlier in the past decade and became known as the "Kaatsu master" before the two parted ways. Stray-Gundersen then created his own blood flow restriction methods and a company, B Strong, in 2016.

"You can get the benefits of swimming 10,000 yards by swimming maybe a thousand," he said recently.

Andrew, 22, a rising star who will swim three individual events and participate in relays in Tokyo, said he first started experimenting with blood flow restriction five years ago at the urging of Chris Morgan, a veteran swim coach.

He often straps the bands onto his arms for 25-yard sprints and tries to achieve the same times as when he is not wearing them.

"Obviously, it's very difficult," Andrew said in an interview this month. "But you are simulating a sensation of real pain that tricks the body into regrowth."

The swimmer entered a small business relationship with Sato's company after years of using its products. (If a customer uses Andrew's code, Kaatsu donates 20 percent of the sale to Andrew's swim club.)

Before and after training and races, Andrew straps a gadget high onto each leg, then increases and decreases the tension of the tourniquet at regular intervals — think of a blood pressure cuff — to stimulate blood flow and recovery. Sometimes he wears the bands in the ready room before heading out to the pool deck for a race.

Andrew at the U.S. swimming trials in June. He said he first started experimenting with blood flow restriction five years ago. Credit...Hiroko Masuike/The New York Times

Not everyone has jumped on the bandwagon. Dave Marsh, who has coached numerous swimmers to the Olympics and is directing Israel's team in Tokyo, said one of his athletes had used blood flow restriction for recovery and rehabilitation from injury, but he had yet to recommend it in training.

"The first job of a coach is to not do any harm," Marsh said. "It seemed to me that with blood flow restriction, it could lead an athlete to take a step backward."

Like any good sports scientist, Stray-Gundersen wanted to see the data when a colleague told him that blood flow restriction was helping his athletes build muscle mass in two weeks that normally took six. As it turned out, there was a paper from 2000, published by Sato and scientists at research institutes in Japan, in the Journal of Applied Physiology.

Put simply, the paper argued, blood flow restriction prompted an outsize response from the brain to speed up the normal process of repairing and rebuilding damaged tissue.

Cutting off blood flow, then switching it back, can spur the brain to use more healing powers than it would normally think it needs.

Since that study, a number of independent researchers have confirmed the potential benefits of restricting blood flow during exercise. Shawn M. Arent, the chairman of the Department of Exercise Science at the University of South Carolina, is currently conducting a study on its effects for the Defense Department.

He said early trends suggested that the practice might be most effectively applied when athletes wanted to dial back their training load without sacrificing fitness, either while tapering before competition or at the end of a season, while recovering from injury.

"It's a good supplement for training; it's not all of your training," Arent said. "It provides physiological stimulus when other things might be limited."

Sato said he accidentally discovered the benefits of blood flow restriction more than 50 years ago, during a Buddhist ceremony in a Japanese temple that required him to sit on the floor in the seiza position — bent knees with his heels under his rear end — for long periods. His calves and toes began to tingle, and he could no longer stand the pain after 45 minutes. When he stood, he saw his calves pump up with blood, and his legs felt as they did during a workout.

Sato thought perhaps there might be some connection between cutting off blood flow to muscles and training them. He began tying karate belts and later bicycle inner tubes around his legs and performed a series of experiments, tracking how much the circumference of his thighs and calves would grow even when he performed fewer repetitions.

In 1973, Sato broke his ankle while skiing and restricted blood flow to the area during rehabilitation, letting it rush in periodically. A recovery that doctors told him might take four months took a little more than one.

"Pressure on, pressure off," he said. "The benefits for both training and recovery was understood."

For someone like Andrew, who swims thousands of yards every day, or Rupp, whose regimen includes more than 100 miles each week plus weight training and core work, or Noah Syndergaard, the pitcher for the Mets, or Mikaela Shiffrin, the champion skier, or any of the other top athletes who have started incorporating blood flow restriction, the technique allows them to reduce the likelihood of a repetitive stress injury and speed up recovery time.

For Andrew, the most important part of the technique may be how strongly he believes it works. As every sports scientist knows, placebos can often be as strong as any drug.

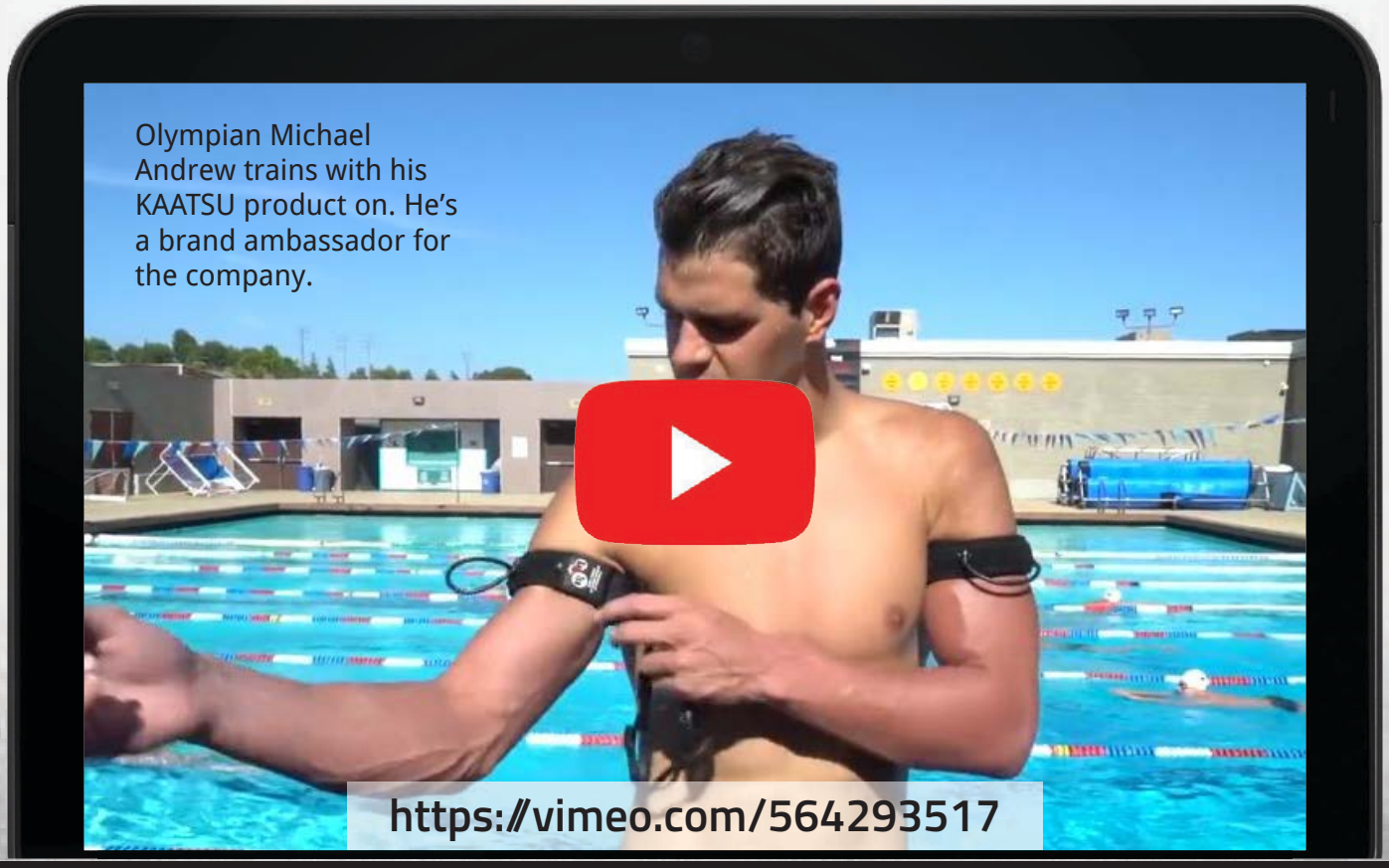
"I did something like 18 races in seven days at the trials, and I felt fresh," Andrew said. "I'm sure it was because I was so disciplined with the recovery. I used it all the time."

INVERSE

The scientific reason why Olympians are embracing this new fitness trend

What do Olympians, Navy SEALs, and many women over the age of 55 all have in common? They've embraced a new kind of physical therapy and training method called blood flow restriction (BFR).

> "Literally every single day of the Olympics, I've had calls."



Olympian Michael Andrew trains with his KAATSU product on. He's a brand ambassador for the company.

In Tokyo, athletes (and sometimes brand ambassadors) like Michael Andrew and Galen Rupp have been spotted in the tell-tale bands, reducing blood flow in their arms and legs as part of a post-sport recovery.

Steven Munatones is the CEO and co-founder of KAATSU, a company that developed the original BFR method under its inventor, Yoshiaki Sato, and sells specialized equipment for it. An inventor and researcher, Sato developed the method — also referred to as kaatsu — in the 1960s. Munatones, meanwhile, is an International Marathon Swimming Hall of Fame inductee.

"Literally every single day of the Olympics, I've had calls from discus throwers from Australia, rowers in Romania, powerlifters from Poland, you name it," Munatones tells *Inverse.*

"These athletes are saying, 'Hey, you know, I just found out about your product here in the Olympic Village, is there any way I can get my hands on a unit?'"

Turns out, there might be something to it. While a trend to spectators — remember cupping during the 2016 Olympics? — sports medicine doctors have already given their modest approval to the practice as a supplement to strength training and post-operative physical therapy.

However, the science remains mixed: For example, in a 2020 study, blood flow restriction is described as an "innovative training method for the development of muscle strength and hypertrophy," while a 2021 systematic review of the practice argued there was "limited evidence" that it actually improved vascular function in healthy young adults.

Munatones, as well as some professional athletes, give it much more credit, claiming it can help with recovery, rehabilitation, even resetting circadian rhythms.

What is blood flow restriction?

This is how blood flow restriction works: Specialized bands — a little like a blood pressure cuff at the doctors' office but narrower — are placed around the top of an arm or a leg.

"Suddenly your hand goes from very light pink to **rosy pink** to a beefy red."

They are inflated via a small electronic unit to induce light pressure on the muscle. The wearer engages in low-intensity resistance training, like repetitions of a bicep curl, but with less weight than usual. Blood flows to the muscles past the band, and the muscles progressively swell with more blood as their trip back towards the torso slows.

"Suddenly your hand goes from very light pink to rosy pink to a beefy red," Munatones explains.

"When it gets beefy red, what's actually happening is all the very small capillaries that we don't even think about — that we don't even realize we have — are totally engorged in blood," he says.

In traditional strength resistance training, stress is put on the muscles by lifting weights or using

"SUDDENLY YOUR HAND GOES FROM VERY LIGHT PINK TO ROSY PINK TO A BEEFY RED."

your own body weight, which essentially leads to small tears in the muscle fibers and eventual repair when you rest. With enough training, muscle fibers grow in size in a process called hypertrophy — something weightlifters are normally seeking.

According to Lance LeClere, an orthopedic doctor with the U.S. Navy who co-authored a 2019 review on BFR, there are two components to the practice: "More muscle fibers are being used during exercise, and they are being signaled to become larger as well," LeClere told *Inverse*.

Repetitions for therapy or exercise can be done with "20 to 30 percent of normal maximum effort, which means patients or athletes can get a strenuous workout at much lower levels of weight," he says.

(The U.S. Military academy has partnered with KAATSU on research projects.)

There's some promising evidence supporting BFR in certain contexts:

In 2018, scientists found that older adults doing BFR with low-weight resistance training experienced gains in strength and size in their leg muscles comparable to high-load resistance training after 12 weeks.

In a 2017 study, knee recovery was more successful after operations in 17 people with BFR than without it, when it was combined with physical therapy — but only with certain exercises.

In 2002, scientists found rugby players who underwent low-intensity training paired with BFR, compared to those who did not, saw increases in knee extensor muscles.

What does blood flow restriction do?

A 2013 review of BFR published in *The Journal of Strength and Conditioning Research* lists seven potential mechanisms that may stimulate the body's response to the method.

One theory is that it mimics traditional weight training with much heavier weights. A limb with

Laura Wilkinson, an Olympic diver, uses BFR. Here she is competing in the 2017 USA Diving Summer National Championships. *Getty / Kirk Irwin*

Diver Laura Wilkinson posts about her KAATSU bands. *Laura Wilkinson/Instagram*

a BFR band on it may receive the same kind of "stress" under mild resistance training as one without it, lifting heavy weights.

Another theory revolves around proteins called insulin-like growth factors (IGFs) found in muscles. Bodies produce this in response to exercise, which can help muscles grow. BFR, some studies suggest, increases circulating IFGs in muscles.

Other chemicals involved in strength training may also be at play: For example, metabolites like lactate build up in the part of the body restricted by the bands. This can later lead to muscle growth.

"When our vascular tissue fills up with blood, we are imitating exercise," Munatones says.

"We're mimicking a lot of exercise with KAATSU and we're just sitting at our desk or sitting on our couch," he claims.

LeClere says, "By using lower weight but still building muscle, BFR allows for more aggressive early rehab after surgery."

Who should use blood flow restriction?

Practitioners of KAATSU, which is headquartered in Huntington Beach, California and distributes products and training in over 49 countries, say it's not just about lifting weights.

The practice — and certainly, the countless BFR products that have branched out from KAATSU — seems to be most popular with weight-lifters and gym-types. But its initial growth began with

research on elderly patients with cardiovascular and orthopedic conditions. Older folks are still a huge portion of KAATSU's business.

Munatones says 70 percent of KAATSU's market is women over 55. His mother, who is 83, and his two sisters use BFR regularly. They "use KAATSU so often, and it's simply because it's so gentle, they can do it while they're reading a book, they can do it while they're walking their dog," he says.

Sports medicine doctors seem to agree that it can work in *both* athletes and people with a reduced capacity for exercise, if not as a replacement for exercise altogether.

In an article from a 2017 newsletter of the American Orthopedic Society for Sports Medicine, LeClere and another doctor, Ashley Anderson, write that with normal resistance training, BFR "could result in increased strength and muscle hypertrophy in healthy athletes," and that "BFR while exercising at lower intensity could be used with subjects after surgery or in populations unable to perform higher levels of exertion with routine resistance training."

The method is not without its risks when done overzealously: too much pressure on a muscle, or ischemia, can or cut off blood to the muscles and lead to tissue death.

This is perhaps why Munatones is quick to point out that, when done correctly, the pressure is as gentle as "a really tight T-shirt" and says comparisons to a tourniquet are unfounded.

Why is blood flow restriction popular now?

BFR's rise to prominence is a long time in the making.

Sato, who invented the BFR or kaatsu method, was inspired to investigate BFR after realizing that the restricted blood flow he felt while kneeling during a Buddhist ceremony resulted in the same sort of swelling experienced after he lifted weights.

For years, he experimented on himself, using bicycle tubes to put pressure on his muscles.

One pulmonary embolism, a miraculous recovery from a ski accident— where Sato describes actually building muscle inside a cast during recovery with BFR — and much trial and error later, led him to a patent. In the early 2000s, Sato collaborated with professors and cardiologists at the University of Tokyo and honed the method in trials with elderly patients.

Also in 2000, Munotones — then a member of the US national swim team — wasn't making much headway in promoting it to his colleagues.

"I could not convince my coach and my fellow coaches — people that had known me for a long time — I could not convince them to use KAATSU," he says. "It took me a long time. It took me seven years."

Now, however, the tide has changed: kaatsu has become KAATSU, a brand. Munotones credits mostly word-of-mouth marketing. There are even competitors who branched off after training with the company.

"At first, to be honest, I was rather pissed off. I spent all this time to educate people and pay them, and then they go off and copy it," he says.

But then he started getting more phone calls. "I realized," Munotones says. "'oh, I would much rather be part of a growing market.'"

Could the Kaatsu Workout Be the Most Efficient Exercise?

WSJ | VIDEO

Japanese bodybuilder Yoshiaki Sato says he has a way for Hollywood's aging action stars to stay as youthful and fit as ever. It's a workout regime that promises to deliver the benefits of a three-hour workout in only 30 minutes. Photo: Miho Inada/The Wall Street Journal

https://www.wsj.com/video/could-the-kaatsu-workout-be-the-most-efficient-exercise/55EF4814-6C30-4CE5-859A-D32E144741FA.html

CAN YOU WORK OUT LESS, GET MORE RESULTS?

THE WALL STREET JOURNAL.

By Eleanor Warnock and Rachel Bachman

Kaatsu training is drawing more adherents with promises of more gain, less pain

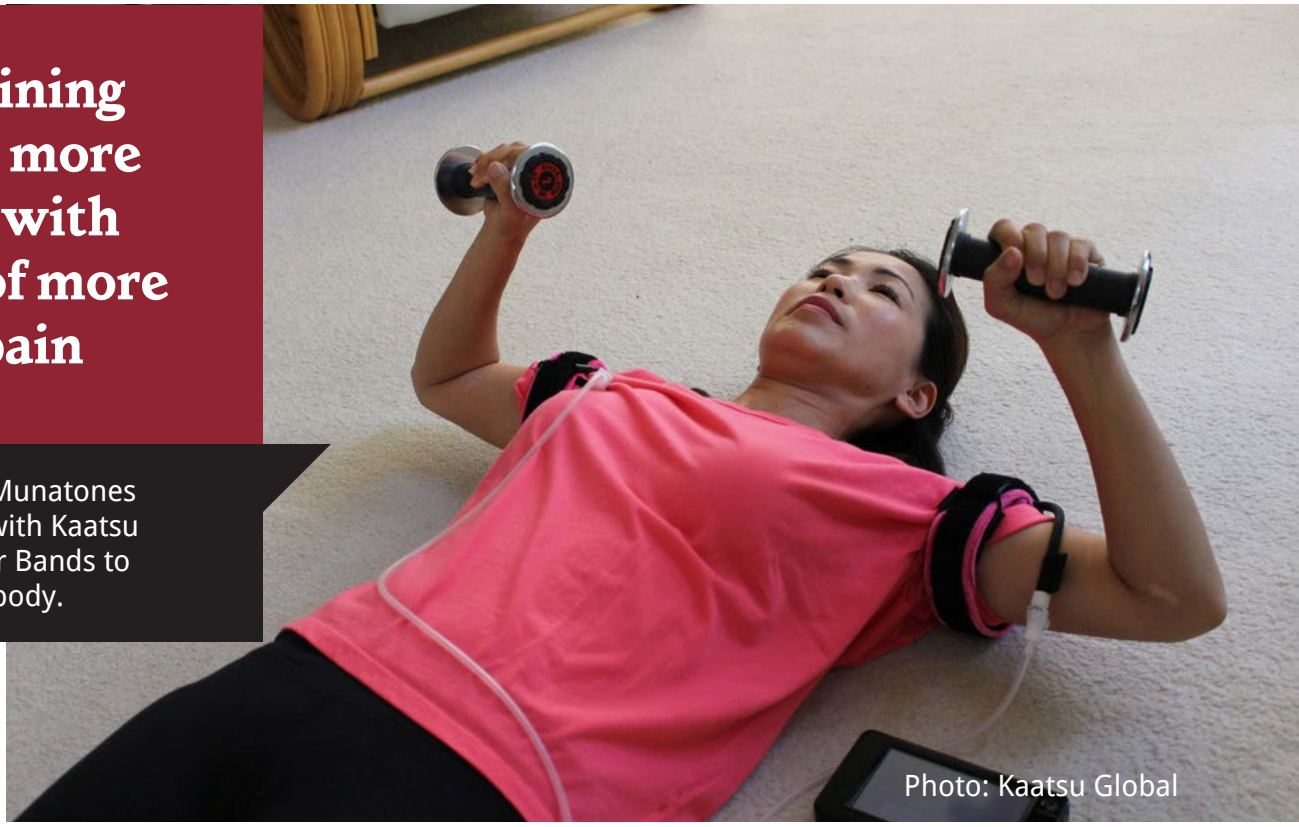


Photo: Kaatsu Global

Homemaker Rieko Munatones doing bench press with Kaatsu Nano and Kaatsu Air Bands to work on her upper body.

American skier Todd Lodwick suffered a shoulder injury in a crash about a month before the 2014 Winter Olympics in Sochi, Russia. The six-time U.S. Olympian in Nordic combined, an event that pairs cross-country skiing and ski jumping, faced final preparations with his left arm immobilized in a sling.

Mr. Lodwick got himself ready for the Games by exercising with pressurized cuffs around his arms and legs under the supervision of a medical professional, says Dave Jarrett, the U.S. Nordic combined coach. The technique, which restricts blood flow to the limbs, is called Kaatsu training. Mr. Lodwick's four-man team ultimately finished sixth.

"Doing the Kaatsu training helped him not only be there but be somewhat competitive after such an injury," Mr. Jarrett says.

Kaatsu increasingly is drawing athletes seeking a quicker recovery from injuries and regular people hoping to get a bigger payback from their usual workout. Researchers in the U.S. received funding this year from the National Space Biomedical Research Institute, an arm of the National Aeronautics and Space Administration, to study whether Kaatsu can help astronauts endure gravity-free conditions in future space missions.

THE KAATSU CHOICE:
HIGHER PRESSURES OVER HEAVY WEIGHTS

"Your legs are stronger than life..." said New York Mets outfielder Yoenis Cespedes. He was explaining his condition after a tough KAATSU leg workout with ESPN sports broadcaster Jessica Mendoza in an ESPN interview.

Mendoza tried KAATSU with Cespedes and Mike Barwis, an early adopter of KAATSU, at the Barwis Methods Training Center in Port St Lucie, Florida.

Personal trainers, strength and conditioning coaches, and exercise physiologists believe that optimal muscle building requires lifting of weights or doing resistance exercises. This leads to DOMS (Delayed-onset muscle soreness) that is felt after a hard workout and acute muscle soreness that is felt during or immediately after a workout.

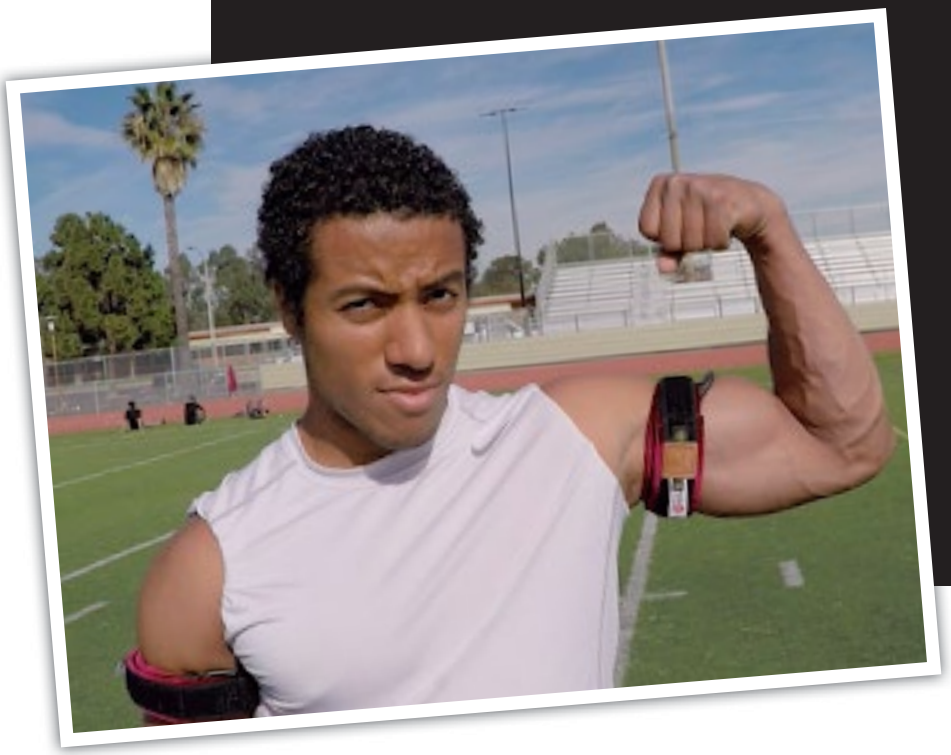
Conventional wisdom is that the heavier the weight and/or the more repetitions or time in the gym, the larger and faster muscles will develop.

The muscle-building process leads to DMOS where the muscle fibers are damaged while weight lifting, and leads to the secretion of HGH

(Human Growth Hormone) that results in muscle recovery, growth and size.

Practically, this means that if you are bench pressing 50 kg in 3 sets of 12 repetitions, and then gradually increase the weight to 55 kg in 3 sets of 12 repetitions, then not only are you psychologically satisfied with your performance, but you are also getting stronger and most probably bigger in size.

And usually sore for a while after every weight training session.



Figuratively speaking, a strength and conditioning coach wants their athletes to lift more weights over more repetitions.

Let's imagine that those weights are rocks. Let's place those rocks in a bucket and ask the athlete to lift those imaginary buckets.

If the coach wants to increase their weight of that bucket, he will add another rock. But at some point, the bucket will be filled and no more rocks can be added.

But what if those rocks were replaced by sand? Rocks are clearly heavier than sand. But, if we filled the bucket with sand - tiny particles of little rocks - the overall weight of the sand-filled bucket will be even greater than a bucket filled with larger, heavier rocks.

Now imagine the coach wants to increase the weight of the bucket for his athlete. He cannot add another rock, but he can add some additional sand.

The sand enables micro increases of weight in a way that rocks cannot. This can enable the coach to help his athlete very gradually and very minutely increase the weight and performance gains.

Now figuratively imagine, a clever coach used powder instead of sand in his imaginary weight training bucket. Powder is obviously lighter than sand and significantly lighter than rocks. But powder enables the coach to very precisely and gradually increase the weight and strength of his athlete.

Essentially, the sand and the powder enables a more precise means to very incrementally increase the strength and performance of an athlete.

Using KAATSU is similar to this analogy of using rocks versus sand versus powder.

KAATSU equipment enables strength and conditioning coaches to very precisely and MUCH more frequently increase the strength and size of their athletes in addition to their speed and stamina.

The preciseness and specificity that is enabled by KAATSU the original BFR is unparalleled. With KAATSU equipment, one pressure point increase is the figurative and literal amount that is equivalent to a single grain of sand or tiny bits of powder. For elite athletes who seek victory by being only incrementally faster, better, and stronger than their opponents, KAATSU - or the

> Performed regularly and ideally daily for less than 20 minutes per day, these incremental increases in performance and in the Quality of Life makes significant changes in the lives of healthy athletes and injured individuals.

equivalent of adding sand or powder to your bucket - can be the incremental difference.

Likewise, for a stroke victim or a paraplegic who is striving to make only slight incremental improvements in their movements or strength, KAATSU enables the tiny increases in their Quality of Life. Performed regularly and ideally daily for less than 20 minutes per day, these incremental increases in performance and in the Quality of Life makes significant changes in the lives of healthy athletes and injured individuals.

Some younger and some male athletes frequently want to lift heavy weights with their KAATSU Air Bands on.[1] But it is not necessary to get bigger and stronger. The real key is two-fold:

- do KAATSU Cycles before and during the strength-training session
- finish off with some KAATSU Training
- increase the SKU pressure of the KAATSU Air Bands in the KAATSU Cycle and KAATSU Training mode instead of adding resistance (weights) to your lifts[2]

[1] As shown with New York Mets' Yoenis Céspedes in the ESPN report above.
[2] If you want to feel some resistance, you can use very light weights (e.g., water bottle or light dumbbells) and/or contract your muscles in the both the positive and negative directions.

"I will forever and always rave about Operation Healing Forces, because this is an organization that shows the heart of God. When people are in need, you help them, and that's what they do."

Brooke Adams, OHF 2020 Immediate Needs Recipient

THE MISSION

The mission of Operation Healing Forces (OHF) is to help active-duty and recent-veteran wounded, ill and injured Special Operations Forces (SOF) and their families with mental, physical and emotional healing. Its goal is to help them return to the fight or transition successfully into civilian life.

THE PARTNERSHIP

KAATSU Global has partnered with OHF to aid SOF and their families by donating 3% of its online sales and supplying KAATSU equipment to foster rehabilitation, reintegration and resiliency in the Special Operations community.

operationhealingforces.org

KAATSU IS ALSO USED BY . . .

The American Olympic swimmer Michael Andrew does blood flow restriction training.

Clive Rose/Getty Images

EVERYDAY HEALTH

Olympic Athletes Are Into Blood Flow Restriction Training — Does It Work?

By Leah GrothMedically Reviewed by Justin Laube, MD

Blood flow restriction training is a hot fitness trend at the Tokyo Games. While there's evidence it may be effective, experts say the trend may not be ready for prime time for the home athlete just yet.

Top athletes have repeatedly introduced the world to new training and recovery strategies — with the Olympics being one of the biggest platforms on which to do so. In 2016 in Rio, we learned about cupping. In 2012 in London, we learned about kinesio tape.

At the Tokyo Olympics, the new trend is blood flow restriction (BFR) training. The American swimmer Michael Andrew and the American marathon runner Galen Rupp have both been spotted with tourniquet-like bands on their limbs used for BFR, *The New York Times* reported July 21.

BFR training is a technique in which pressurized bands (which look similar to blood pressure cuffs) are worn around the arms or legs to slow blood flow to specific muscles during training. It's thought to trigger the body to build more muscle mass than it otherwise would at that training intensity.

During BRF training, periods of blood flow restriction are paired with periods of rest during

> **Almost all Olympic athletes include strength training in their preparation, and thus there is a way in which blood flow restriction could be incorporated."**

which blood flow is restored to the area, explains Elizabeth C. Gardner, MD, an orthopedic sports medicine surgeon at Yale Medicine and the head team orthopedic surgeon at Yale University Athletics in New Haven, Connecticut. "This allows the involved muscles to reap the benefits of much higher intensity training, while protecting the injured limb from higher stresses."

And while it may be getting more attention thanks to this year's Olympic Games, the technique itself is not brand-new. Yoshiaki Sato, MD, PhD, is widely credited with developing BRF for muscle training and injury recovery in the 1960s in Japan. He patented his version of the training technique in the 1990s under the brand Kaatsu (now a company that makes its own BRF devices and offers training programs).

What Does the Science Say About Blood Flow Restriction Training?

During BFR training the tight band or strap on the involved limb restricts the blood flow in (which carries oxygen) and out (which carries lactic acid and other waste from muscle activity) below the level of the compression. "This temporarily creates a low oxygen environment for the muscle," Dr. Gardner explains.

It's this lack of oxygen that forces the muscles to work harder, increasing protein synthesis in the muscle cells, which is important to both muscle repair and growth.

Training this way affects the fast-twitch, anaerobic muscle fibers (generally used for explosive activities, such as jumping and sprinting), Gardner says.

There's evidence that BFR training can indeed boost athletic training, and may even help patients with chronic pain or other conditions build muscle more easily, as long as it's performed correctly.

A study published in the *Journal of Applied Physiology* in December 2019 found that BFR paired with low-intensity resistance exercise yielded similar muscle gains when compared with high-intensity resistance exercise in a group of 55 adult men over a 14-week period.

A review article published in October 2020 in *Strength and Conditioning Journal* concluded that evidence does suggest BFR training can improve muscle growth in athletes, with the

caveats that research to date is limited and the mechanism of how it works is not fully understood.

But research has also found that many practitioners aren't properly facilitating the use of BFR with their patients. A study published in 2017 in the *British Journal of Sports Medicine*, for example, suggested that many rehabilitation professionals were still unclear about how to use it.

BFR should be administered by trained healthcare professionals who have undergone a certification course, says Julie Ann Aueron, a physical therapist and doctor of physical therapy with Tru Whole Care in New York City, who has been certified in BFT training by Owens Recovery Science (ORS).

Multiple companies, including Kaatsu and ORS, offer BFR certification, she says. And it's usually physical therapists who pursue this sort of certification and administer the training.

Whom Does BFR Training Work for, and Who Shouldn't Try It?

According to Steven Munatones, the CEO and cofounder of Kaatsu Global, who is also a Kaatsu master instructor, several Olympic-level athletes have used Kaatsu BFR training, as well as other professional athletes and amateur athletes participating in extreme sports (like ultramarathoners and mountaineers). Andrew has been a Kaatsu user since his teens, when he won his first swimming title, in 2016, according to a blog post from the company.

"During competition, especially during a long competition like the Olympics, some athletes have either a long break between events or games or must wait awhile before their first competition day. They might choose to use BFR in order to keep their muscles, and minds, feeling strong, while limiting the stress on their joints and thus trying to limit injury," Gardner says.

But others beyond top-level athletes stand to benefit from BFR.

Gardner explains that it may be an effective technique to build strength and muscle mass in patients with chronic pain who are not able to tolerate higher loads on their body. "Patients with chronic conditions that cause muscle loss, such as HIV/AIDS and COPD, may also benefit, although this must be discussed with the patient's medical provider in order to prevent complications," she says. A review published in *Frontiers in Physiology* in August 2019 concluded that BFR training yielded various benefits to older adults, those at greater risk of falls, and people with kidney disease, musculoskeletal issues, and various types of osteoarthritis.

There are potential risks associated with BFR training if it's not done properly, says Drew Contreras, a doctor of physical therapy and the vice president of clinician integration and innovation at the American Physical Therapy Association. "If BFR is done without proper equipment and guidance, there can be permanent damage to muscle and blood vessels," says Contreras.

More specifically, improper cuff width, too much restriction pressure on the tourniquet, and improper placement of the cuff can all cause complications, including soft tissue damage, numbness [from nerve injury], and pain, Gardner says. "It is crucial to do this with a trained healthcare professional, like a physical therapist."

Unless you're young and athletic, it's a good idea to check with your doctor before trying BFR. Additionally, if you've recently undergone surgery, you have an underlying medical condition (particularly ones that can affect baseline blood flow to the extremities, like heart disease or peripheral vascular disease), or you're an older adult, talk with your doctor before considering BFR training, Contreras says.

Gardner notes that people who should generally not use BFR include (but are not limited to) those with current or past blood clots, a diagnosis of a blood clotting disorder, bleeding disorders (including thrombophilia), and infections within the involved limb, as well as women who are pregnant.

The Bottom Line: Should You Try Blood Flow Restriction Training?

In the hands of an experienced practitioner, BFR training can be a useful tool to support musculoskeletal rehabilitation for injury recovery — and to support strength and muscular conditioning training for athletes and some patients with chronic conditions.

"Any athlete could potentially benefit from blood flow restriction training," says Gardner. "Almost all Olympic athletes include strength training in their preparation, and thus there is a way in which blood flow restriction could be incorporated."

She does note that if it BFR is used, it should be part of a multimodal approach, including other forms of exercise, resistance training, and aerobic training. And in order to be safe, as well as reap maximum benefit, it is important that the evolving practice guidelines for blood flow restriction be followed under the guidance of a skilled physical therapist or physician.

If you want to try BFR, Aueron suggests consulting with your physician and a physical therapist who has formal training in BFR who could help you decide whether BFR may be a safe and effective therapy to add to your athletic or rehabilitation program.

Olympians are wrapping their arms and legs in blood flow-restricting bands to build muscle mass and avoid injury

INSIDER

By Rachel Hosie

Swimmer Michael Andrew has been using blood flow restriction to prepare for Tokyo 2020. Getty/Al Bello/Gabriele Maltinti

Olympians are using blood flow restriction training as a muscle building technique to prepare for the Tokyo Olympics.

The technique involves wrapping up the limbs to limit blood flow to the muscles, Insider previously reported.

Not only is blood flow restriction designed to help build muscle without lifting very heavy weights, it can also be used to boost endurance and aid recovery.

The New York Times reported athletes like swimmer Michael Andrew, 22, and long distance runner Galen Rupp, 35, have both been using the method in the leadup to the games.

According to the Times, Andrew has been wearing "tourniquet-like bands" on his arms and legs in the Tokyo practice pool, and Rupp has been strapping up his legs.

Andrew said he swims with the blood flow restricted in his arms, and tries to match the times he swims normally.

"Obviously, it's very difficult," Andrew said in an interview reported by the Times.

"But you are simulating a sensation of real pain that tricks the body into regrowth."

He said he also uses the bands before racing and to aid with recovery.

Blood flow restriction training was invented by a man named Yoshiaki Sato in Japan, where it's known as KAATSU.

"It's very useful for training around an injury that doesn't allow for heavier loads to be used," personal trainer Harry Smith previously told The Independent.

"Blood-flow restriction training forces you to use much lighter loads than you usually would as the restricted venous return traps blood in the muscle, limiting its range of motion to an extent and causes a huge build-up of metabolites and lactic acid."

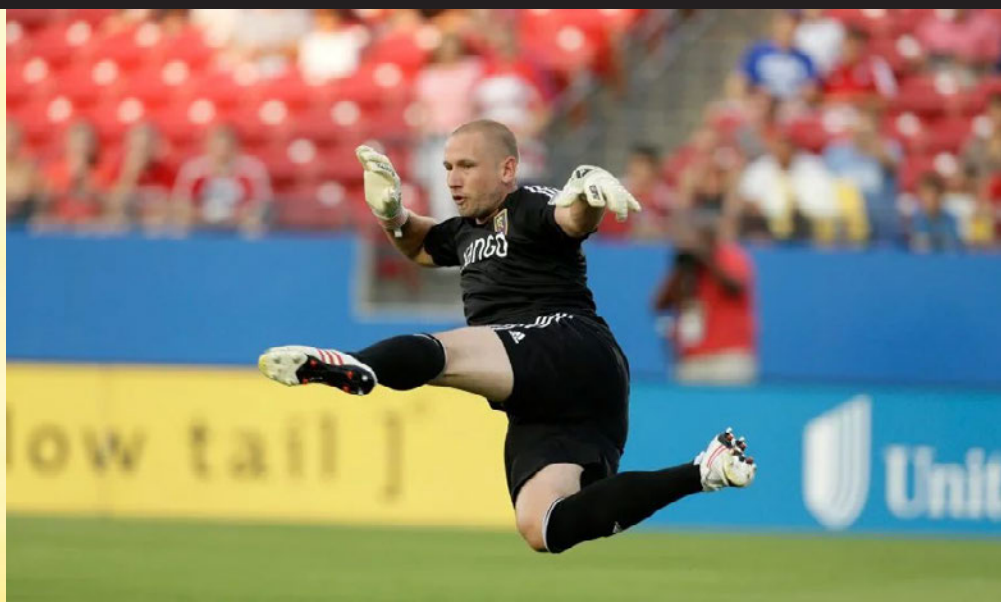
You Should Probably Try This Japanese Blood-Flow Routine

Outside

By MDevon Jackson

Footballers of both kinds have caught on. Here's what you need to know.

> "Normally, you'd have to lift 300 pounds or run a marathon to get the kind of workout you get with not even an hour of this,"
>
> Jim Stray-Gundersen says.



Two to three times a week, New York City FC goalkeeper Josh Saunders takes out two pairs of small padded bands and wraps them tightly around each limb, taking care to keep the attached wires extending down toward his fingers or toes. He then inflates the bands, which are connected by tubes to a touchscreen device, creating pressure on his extremities for a total of 20 minutes—ten for his arms, ten for his legs. Saunders sometimes does this while making his morning coffee. If this sounds like the setup to an S&M flick, it isn't. This is Kaatsu, a Japanese-created exercise routine that's spreading like, well, like kudzu throughout the world of fitness coaches, athletes, and physical therapists, and one Saunders credits with resurrecting his professional career.

In late July 2013, two weeks after his fourth surgery to repair a torn left ACL, which he injured in a game against Dallas FC while playing for Real Salt Lake, Saunders discovered that the 30 pounds of weight he'd suddenly dropped and agonizing pain he was suffering weren't just symptoms of his injury. Saunders was suffering from a potentially fatal bone infection that had the potential to cost him not just his athletic career but also his leg—and maybe his life. Luckily, doctors managed to clean out the invading bacteria before it could spread, but the process involved two more procedures: a bone graft and reconstruction. The reconstruction was performed by Dr. Vern Cooley, the surgeon who repaired Tiger Woods' ACL. And it was Cooley who introduced the 34-year-old keeper to Dr. Jim Stray-Gundersen, a Park City, Utah–based sports science adviser for the U.S. Ski and Snowboard Association and chief medical officer of Kaatsu's global organization, to help him through his rehab.

A portmanteau of the Japanese words *ka* (meaning "additional") and *atsu* ("pressure"), Kaatsu came about in 1966 when 18-year-old Yoshiaki Sato, now a doctor, noticed the intense ache in his calves after having assumed the traditional Japanese sitting position during a typically long Buddhist ceremony. It was an ache much like the one he experienced after lifting weights—an ache he realized had to do the occultation of blood circulation. *Eureka!* Using himself as a test subject, Sato spent the next several years perfecting a system of blood-flow moderation using bicycle tubes, ropes, and straps. He later replaced the tubes with thin computer-controlled pneumatic bands. The idea was to apply pressure around the arms and legs while lifting a light load, safely impeding the flow of blood to exercising muscles. Slowing this flow engorges the limbs with blood, expanding capillaries, engaging muscle fibers, and raising lactic acid concentration. But—and here's part of what makes Kaatsu unique—it fools the brain into thinking it's being put through a vigorous workout.

"Other forms of exercise may cause some degree of blood-flow restriction while being performed, but it is not consistent, and once you stop the exercise to rest between sets, blood flow is quickly reestablished and the muscle somewhat recovers," explains Alan Mikesky, professor of kinesiology at Indiana University-Purdue University Indianapolis. "With Kaatsu training, blood-flow restriction is maintained throughout the duration of the exercise, even during the rests between sets. As a result, the muscle can't recover as quickly." This creates, adds Mikesky, a "unique muscle-cell environment that provides the stimuli that cause muscle adaptations in size and strength." Stimuli that Kaatsu kicks into gear in about half the time using about a third the amount of weight.

"It puts out a very robust response," says Stray-Gundersen, who was first introduced to Kaatsu in 2013. Though skeptical at first, the doctor finally tried Kaatsu on himself and started seeing improvements in athletes as well as non-athletes. "Normally, you'd have to lift 300 pounds or run a marathon to get the kind of workout you get with not even an hour of this," he explains. "And because you're not exercising as much, you're doing much less damage to your muscles."

It's these performance benefits that have caused the method to catch on among athletes ranging from European soccer clubs and ski teams to American football teams like the Dallas Cowboys and New England Patriots. World downhill ski champion Bode Miller credits Kaatsu and Stray-Gundersen for getting him from herniated disk surgery last November to being fit enough to ski at the world championships just months later. "Jim's enthusiasm to explain everything very well and show results based on other athletes really turned me on," says Saunders. "I couldn't do any load bearing at all before working with Dr. Jim." But within two days, he says he felt a change in his ability to perform basic exercises, and he started regaining weight. Less than four months after starting Kaatsu, Saunders was back on the field.

Doubters, of course, have pointed to 1980s weightlifters who used blood-flow restriction to not-so-healthy effects, including clotting and rhabdomyolysis. But their equipment was crude by comparison, and often bands were tightened to dangerous points of constriction. Athletes who use Kaatsu have described it as no more discomforting than a blood-pressure cuff. Still, while the bands are portable and available for home use, Stray-Gundersen and others emphasize that it's best to use the method with a trained doctor.

As for Saunders, he's noticeably stronger and has had several of his NYC teammates over to his house to help them work on their recovery. "I also now I have the mental confidence to get through plays because I know I have the strength," he says. "Kaatsu changed my mechanics, and it did so much for me not just physically but also emotionally. I started running correctly. It provided me with the reality that I'd be able to play again."

KAATSU TRAINING IS BLOWING FITNESS RESEARCHERS' MINDS

MilitaryTimes

By Jon R. Anderson

Dr. Jim Stray-Gundersen works with an athlete at the U.S. Ski Team headquarters in Park City, Utah using a revolutionary new training device developed in Japan dubbed Kaatsu. (Courtesy Jim Stray-Gundersen)

And now you must set that aside for a few minutes to consider this:

What if you could get a total-body, muscles-maxed workout, the kind that usually takes hours under heavy, sweat-soaked weights or pounding miles of road and trail, all in less than 30 minutes?

Better yet, what if — after that kind of workout — not only do you not feel any of the typical soreness that comes with pushing your body to total muscle failure, but you're ready to do it again within just a few hours?

And what if you could get that workout with just a few basic body-weight exercises and minimal weights?

Best of all, what if that workout not only adds solid, lean muscle mass, but also significantly increases strength and endurance, while reducing body fat?

All within just a few weeks?

That's the promise of a revolutionary new training system just coming over from Japan dubbed Kaatsu.

"It really does sound too good to be true," says former Army physician Dr.

Brian Law. “That’s exactly what I thought.”

But Law recently tried Kaatsu for less than two weeks. And he’s already a believer.

“I work out a lot. I normally bench press 350 pounds,” says Law, now a researcher at Ohio University. “After 10 days of doing Kaatsu for only about 10 minutes a day, I added 10 pounds to my max bench press — without even using a spotter. All the hours I’ve spent in the gym and, wow, these kind of results after only 10 minutes. It’s pretty cool.”

So cool that Law is among a team of researchers preparing to launch a major two-year study exploring the possibilities of Kaatsu.

He isn’t the only one downright excited about what he’s already experienced.

U.S. ski champ Bode Miller used Kaatsu during a long recovery from injury.

“I’ve been getting a top-to-bottom workout with just Kaatsu alone. That’s a testament to its effectiveness in terms of not just building size, but building functional effectiveness,” Miller says.

“I think it’s also going to be the most widely beneficial [training method] — good for people from 12 years old to 80 and from elite athletes and law enforcement and military to stay-at-home moms and dads. There’s an application for every human on the planet with this.”

Bode Miller takes a jump during training for the men’s World Cup downhill in Kitzbuehel, Austria, on Jan. 22.

Meanwhile, in recent months top performance trainers for U.S. Special Operations Command have started trials using Kaatsu and are introducing the training to key leaders and operators.

Bode Miller, of United States, is airborne as he takes a jump during training for Saturday’s men’s World Cup downhill’s in Kitzbuehel, Austria, Thursday, Jan. 22, 2015.

(AP Photo/Shinichiro Tanaka) (Shinichiro Tanaka)

Bode Miller attends Cantor Fitzgerald and BGC Partners’ 10th Annual Charity Day on Thursday, Sept. 11, 2014 in New York.

(Photo by Andy Kropa/Invision/AP) (Andy Kropa)

So what is this miracle workout?

Pressure cooker

While just emerging in the U.S., Kaatsu has been around for years overseas.

In fact, it's been the secret weapon of elite Japanese athletes for decades, used by everyone from pro baseball players and golfers to sumo wrestlers and martial artists.

A mashup of the Japanese words for "additional" — ka — and "pressure" — atsu — the system puts thin, computer-controlled, pressurized bands around your upper arms and legs to reduce the amount of blood flowing back from the muscles in your extremities.

Think blood pressure cuffs, but thinner, and detachable once inflated to the correct level.

Dr. Jim Stray-Gundersen works with an athlete at the U.S. Ski Team headquarters in Park City, Utah, using a revolutionary new training device developed in Japan dubbed Kaatsu.

By slowing down the blood flow back to the heart, your limbs become engorged in blood, filling normally unused capillaries and mobilizing muscle fibers, while also raising the concentration of lactic acid in the blood — basically what happens during prolonged exercise.

Do just a little actual exercise, and the brain is essentially tricked into thinking the body is undergoing a massive workout and triggers the pituitary gland to pump out growth hormones.

"With very light exercise in a very short amount of time, you get an exhaustive workout that sends a signal to your brain that says, 'Hey, I've done something really hard here — you better help me recover and adapt to it.' The brain then sends out a signal for a hormonal response that causes the muscle to grow and the blood vessels to grow," says Dr. Jim Stray-Gundersen.

"Then on top of that, because there isn't much actual exercise, there's very little muscle fiber damage. Because of that, you just start adapting very fast. You don't have to dig yourself out of a hole."

Stray-Gundersen knows all about digging out of fitness holes. A surgeon and human performance expert, he's the science adviser to the U.S. National Ski Team at Park City, Utah, and has served as the team doctor through six Winter Olympic Games. He also leads performance training for elite athletes and Navy SEALs.

Stray-Gundersen is so enthusiastic about Kaatsu, he has signed on as the chief medical officer to help bring the training system into the U.S.

"I didn't believe it either at first," he says. "But it's hard to argue with the results."

During one informal study with cross-country skiers fighting for spots on the U.S. Olympic team, "we saw a 10 to 12 percent increase in strength after using Kaatsu, compared to what they would have had otherwise. To be able to improve someone who is already strong and

Dr. Jim Stay-Gundersen works with an athlete at the U.S. Ski Team headquarters in Park City, Utah using a revolutionary new training device developed in Japan dubbed Kaatsu.

(Staff/Jon R. Anderson)

already fit by that amount is huge."

Before starting Kaatsu training, Stray-Gundersen put the skiers through a battery of one-minute, rapid-fire calisthenic tests — pushups, situps, pullups, box jumps and dips.

"They all showed a dramatic improvement over just 10 sessions done in the course of five weeks," he says. "Not a lot of people can rip off a pushup a second and keep that pace. Usually, the pace starts to fade. What we saw with Kaatsu is that they were able to just keep that pace going longer."

Military application

Stray-Gundersen thinks the application for the military is massive: "You could imagine every drill instructor using Kaatsu for basic recruits and then higher-level operators who have mastered the techniques doing it on their own as a very quick and efficient way to get their strength training done."

If that sounds like a promise that anyone in the military would see major fitness gains using Kaatsu: "I guarantee it," he says.

While research in the U.S. is just getting started, Kaatsu has already been vetted by scores of peer-reviewed studies in Japan.

"Every study I've read supports that there's all this increase in growth hormones and body chemicals that literally cause the muscles to grow," says Law, the Ohio University researcher.

The two-year study on Kaatsu he's helping put together will explore how Kaatsu improves strength and endurance among 18- to 35-year-olds.

"This is going to be huge in the military," he adds. "Frankly, I'm not sure why it isn't already. ... I have to believe that in the next couple of years this is going to blow up like wildfire."

Indeed, Bode Miller isn't the only member of the U.S. Ski Team to experience firsthand how effective Kaatsu can be for recovering from injuries.

Olympic Nordic combined 2010 silver medalist Todd Lodwick was in the final weeks of preparing for the Sochi Games when he crashed hard during a ski jump, breaking his arm, dislocating his shoulder and tearing a ligament cluster.

Typically, that kind of injury would have required surgery, but that would have scuttled his Olympic bid, so he took his chances recovering with just a cast. And he used Kaatsu to continue his training regimen, Stray-Gundersen says.

Within a month, he was the U.S. flag bearer for the opening ceremonies, going on to help the

Dr. Jim Stay-Gundersen works with an athlete at the U.S. Ski Team headquarters in Park City, Utah using a revolutionary new training device developed in Japan dubbed Kaatsu.

(Staff/Jon R. Anderson)

> If you do it correctly, it's perfectly safe. But if you the leave bands on for a very long time, or lift very heavy weights, you can damage your muscle, or get blood clots and other things that are frankly not very good at all

Nordic relay squad nail down a sixth-place finish in the Games.

Decades in the making

The brainchild of Dr. Yoshiaki Sato, the basic premise of Kaatsu was conceived in 1966. A young athlete at the time, Sato noticed how much his calf muscles hurt after kneeling through long Japanese ceremonies.

He realized the swelling was similar to the pumped-up feeling he got after a vigorous bout of weight training.

It wasn't long before he started experimenting with straps and bicycle tires, says Steve Munatones, a former U.S. Olympic swimming coach who has become Sato's lead evangelist in the U.S.

Today, Sato's patented system is in wide use throughout Japan, but few have even heard of it outside of the country.

"Japanese athletes think of it as their edge, so they don't talk about it much," he says.

Fluent in Japanese, Munatones has spent several years translating Sato's work and procedures and helping get the word out.

"I'm used to the skepticism," says Munatones. "It sounded like a lot of hocus-pocus when I first heard about it," he says. But as soon as he tried it himself, he realized this was no smoke and mirrors. Once he wrapped his head around the mechanics of Kaatsu, he was hooked.

"It's completely changed my view of sports and human performance," he says. "That's the beauty of Kaatsu. Once you understand the physiological processes that are happening, it makes sense. But like any new invention, until someone actually lays it out, no one can see it."

An athlete at the U.S. Ski Team headquarters in Park City, Utah, works out using Kaatsu leg bands.

Aqua Kaatsu

About two years ago, Munatones — an avid swimmer himself — convinced Sato to make a version of Kaatsu bands that could be used in water.

"Swimmers are creatures of habit. I've been doing the same workout — the same number of laps — since I graduated from college." Now 52, he'd been painfully aware of the increasing time it took to finish that workout.

"The pace, intervals, number of strokes — everything was getting slower. I knew this was the natural outcome of aging."

Once he started using Sato's new aqua bands, that natural decline began a remarkable reversal. Within 14 months, he had shaved 15 percent off his already impressive 200-yard butterfly time, dropping it to 2 minutes, 7 seconds. "I'm as fast now as I was in my late 20s," he says.

Munatones says he's eager to see what the military does with Kaatsu.

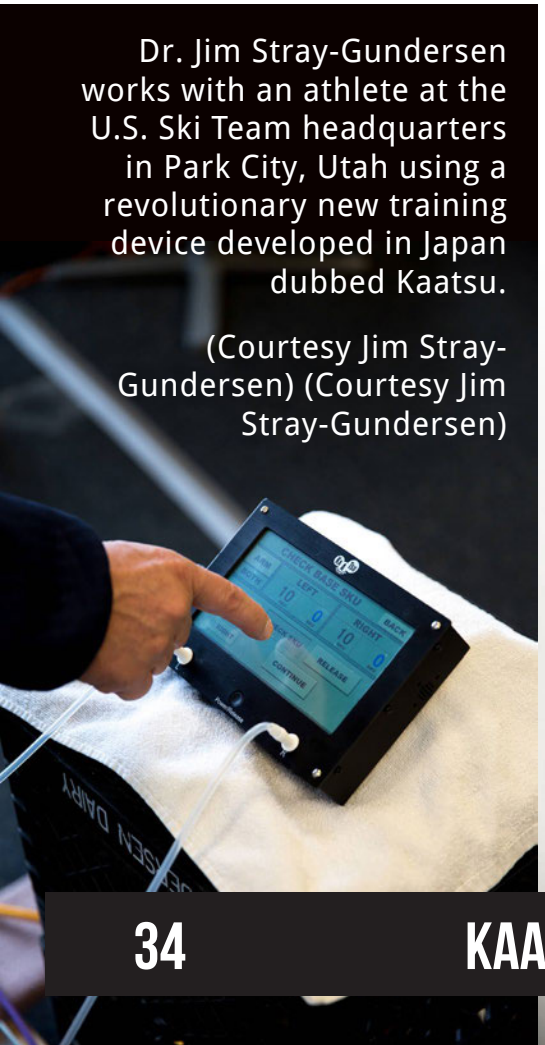
Early interest from SOCOM

While the Kaatsu gear and training are only just becoming publicly available, the U.S. military has been among the

first in line to begin working with it.

"It's the real deal," says one top official with Exos, a fitness and performance company that staffs a broad swath of special-operations units with exercise physiologists, strength and conditioning coaches and other experts. "It's controversial, because a lot of people just don't believe it can work — but this stuff is legit."

U.S. Special Operations Command bought 10 Kaatsu systems just a few months ago. In late January, Munatones traveled to the command's headquarters in Tampa, Florida, to train one of SOCOM's top human performance experts — also a top Navy SEAL — on how to use the water version of Kaatsu gear.



Dr. Jim Stray-Gundersen works with an athlete at the U.S. Ski Team headquarters in Park City, Utah using a revolutionary new training device developed in Japan dubbed Kaatsu.

(Courtesy Jim Stray-Gundersen) (Courtesy Jim Stray-Gundersen)

For now, the command is keeping any official comment on Kaatsu to a minimum.

"We are conducting a limited trial. It's too early to tell anything about it in terms of the results we're seeing," says a spokesperson for the command.

Meanwhile, however, about two dozen special operations leaders — from SEAL units to the Army's Ranger Regiment — were given a hands-on introduction to Kaatsu during a recent gathering at Pearl Harbor, Hawaii.

"Our understanding is that everybody loved it," Stray-Gundersen says.

By slowing down the blood flow back to the heart, your limbs become engorged in blood, filling normally unused capillaries and mobilizing muscle fibers, while also raising the concentration of lactic acid in the blood — basically what happens during prolonged exercise.

Photo Credit: Courtesy of Jim Stray-Gundersen

Kaatsu is safe and effective — but only when used properly, advocates caution.

That's why the company requires certification for anyone buying the gear.

And none of it is cheap:

- **Online certification course ($1,000)**: Designed to train Kaatsu providers and users on proper use of Kaatsu gear.
- **Master Unit ($4,000)**: With robust air pumps, intended for multiple users in a gym or Kaatsu studio. Air Bands are inflated and then disconnected. Used with standard electrical outlets or on a rechargeable battery. Memory capacity for multiple clients and multiple certified specialists.
- **Nano Unit ($1,200)**: An auxiliary lightweight device intended for one person at a time who remains connected to the Nano while exercising. Designed for outdoor use and travels easily. Rechargeable battery, limited memory capability.
- **Air Bands ($298)**: One set containing two arm bands and two leg bands.
- **Aqua Bands ($189)**: One set containing two arm bands and two leg bands, intended for use in water.

"If you do it correctly, it's perfectly safe. But if you the leave bands on for a very long time, or lift very heavy weights, you can damage your muscle, or get blood clots and other things that are frankly not very good at all," says Stray-Gundersen, chief medical officer for Kaatsu USA. He says the company is set to begin selling the workout gear to the general public in the U.S. very soon.

Why Athletes Love Blood Flow Restriction Training

howstuffworks

By Joanna Thompson

The Tokyo Olympics are officially over. All the points are scored, the medals awarded and the flame extinguished. Now athletes have three years to prepare for the next Games in Paris.

But where to start Olympic preparation? For some athletes, the next round of training will likely involve a technique that garnered a lot of buzz this year in Tokyo: blood flow restriction training, otherwise known as Kaatsu.

The Birth of BFR Training

Blood flow restriction training, or BFR training, is a technique in which athletes intentionally limit the blood flow to a specific area of the body during a workout using a band or cuff.

The very first study on BFR was published in the Journal of American Medicine in 1937. However, it did not garner much attention at the time. By far the most well-known version originated in Japan in 1966. Known as Kaatsu, it is the brainchild of Yoshiaki Sato, a former powerlifter turned exercise physiologist. By his own account, inspiration first stuck when a young Sato attended a Buddhist ceremony that required him to sit on the floor in the traditional seiza position ("correct sitting," which means sitting with legs bent, knees forward and buttocks resting on the heels) for an extended period of time. After a while, his lower legs began to go numb. Upon standing up, he noticed that the sensation was similar to the dead-legged feeling of completing a hard workout.

By far the best-known version of the blood flow restriction training method originated in Japan in 1966. Known as Kaatsu, it is the brainchild of Yoshiaki Sato, a former power lifter turned exercise physiologist. Kaatsu

This experience prompted Sato to experiment with restricting blood flow to various muscle groups in order to induce similar physiological changes as hard exercise. He found that by lifting light weights with restricted circulation, he was able to "achieve a significant pump up effect," by his own account. After a patent and a Ph.D., he began selling his system in the 1980s.

That's the background; let's take a closer look at what BFR actually does to the body.

Marinating Muscles and Avoiding Atrophy

If you've never used them, you might be wondering: what do Kaatsu and similar BFR bands feel like? "Just like a blood pressure cuff," says Jamie Burr, a cardiovascular and exercise physiologist at the University of Guelph in Ontario, Canada. "You can feel the congestion of blood. There's a tightness and a pressure."

When blood flow is restricted to active muscles, your body can't effectively clear lactic acid, which leads to a buildup of metabolic byproducts that bathe your muscle fibers in a stress-inducing mixture. "In my lab, we affectionately refer to that as marinating," says Burr.

Once blood is allowed back into the marinated muscles, your body will work extra hard to repair them, stimulating growth and strengthening. Essentially, this mimics the effects of very intense exercise using a much lower workload. A systematic review of 237 studies on BFR training found that 78 percent reported "significant" increase in muscle strength compared to a control group.

Aside from elite athlete training, BFR could be beneficial as a therapeutic tool. To test this application, Burr and his team are conducting a study in which healthy athletes use a cast and crutches on one leg to simulate muscular atrophy after a broken bone. After two weeks, the researchers divide the participants into four groups: one treated with BFR, one with electrical stimulation, one with a combination of BFR and electrical stimulation, and one that received no treatment.

The results are yet to be published, but Burr says that they have been encouraging. "Long story short, what we found was this is really effective for an injured athlete in preventing muscle wasting in the first place."

To the Olympics and Beyond

At the Tokyo Olympic Games, a number of prominent athletes, including Team USA marathoner Galen Rupp and swimmer Michael Andrew, were spotted sporting BFR bands around their limbs. And the trend is taking hold with more than just Olympic athletes; the New Orleans Saints reportedly use cuffs to rehab injured players, and NBA player Dwight Howard is a fan.

But if you're not a professional athlete, should you add BFR to your own training routine?

It depends. The key with BFR training, says Burr, is caution. Properly applied (the research suggests), it can be very beneficial. But used incorrectly — too often, with too much pressure, or in someone with an underlying cardiovascular condition — it can be dangerous. Burr recommends talking to an expert before you try BFR, and starting with only moderate cuff pressure and very few reps.

And then there's cost. Proper BFR equipment is expensive. Some Kaatsu systems will set you back over $1,000, and even less high-tech gear can go for over $400. However, if you're willing to spend that much for a training tool, it could provide the proverbial "icing on the cake" before your next big competition. And if you're looking for BFR in a strictly therapeutic capacity, more and more physical therapy offices are beginning to offer BFR for rehabbing atrophied muscles.

One thing is for sure: BFR isn't going away any time soon. Even though it got off to a slow start, "it's really being quite broadly adopted," Burr says.

The History of Kaatsu Training

PHYSICAL CULTURE STUDY

By Conor Heffernan

> “Wrap a band around your bicep until it begins to go numb, then pump out 30 reps with a light weight Trust me, the pump is worth it.”

These are not the words of an enlightened man but rather my first experience of Kaatsu or Blood Restriction Training. Brought to my attention by a training partner whose grasp of science is not always the strongest, Kaatsu training has grown in popularity over the last decade. While my friend’s description may seem appropriate at first glance, there is quite a lot more to this training system than first meets the eye.

With this in mind today’s post seeks to answer three simple questions: what is Kaatsu training? How was it created? And, perhaps most importantly, should you try it?

What is Kaatsu Training?

Despite my friend’s understanding, Kaatsu training is a little more complicated than numbing your arm. InfoFit explained Kaatsu as “occlusion training, [which] involves a pressure cuff to the proximal portion of your limbs while preforming a low intensity exercise session. The device known as a pneumatic tourniquet, is designed to obstruct blood flow (Blood Flow Restriction, or BFR) to target muscle groups and portions of your limbs.’

For our visual learners, Kaatsu Global produced a video on the topic some years ago.

But we’re all here because we have at least a passing interest in gym culture so it’s also fun to include a video of John Meadows, an incredibly likeable bodybuilder with a remarkable pain tolerance.

If like me, you're left utterly bemused by this style of training, you're no doubt wondering how, why and when this was created.

The History of Kaatsu Training

In a 2005 review article for *International Journal of KAATSU Training Research* (Yes it exists), Dr. Yoshiaki Sato meticulously detailed his invention of Kaatsu training. Somewhat surprisingly given the his medical credentials, the discover of Kaatsu was entirely unscientific. As told by Dr. Sato, his initial 'eureka' moment came as a teenager. Sitting cross legged at a Buddhist memorial in 1966, the then High School student's legs went numb. The sensation Sato felt in his calf muscle was remarkably similar to the discomfort he felt during calf raises in the gym.

The swelling in his calf, caused by the reduced blood flow, set about a series of experiments in the gym. Six months after his initial discovery Sato was 'able to achieve a significant pump up effect with KAATSU training.' There was just one problem. Sato ignored the numbness his makeshift restriction training was causing in his legs. The result? A pulmonary embolism and lengthy hospital stay. In an act of true courage or reckless stupidity, Sato was undeterred and continued training, albeit with some major modifications to how he applied pressure to his legs.

Some time after this, Sato was involved in a skiing accident which resulted in both legs being placed in casts. Afraid that the inability to train would cause muscle atrophy, Sato continued to use Kaatsu training. Much to his delight (and his doctor's disbelief), his experimenting with blood restriction training allowed him to keep his had earned muscle. News of his speedy recovery spread and others began to take an interest in Kaatsu training. Through his fitness club, Sato, then undertaking his own medical training, began using Kaatsu on others.

In the early 1980s, Kaatsu training methods were standardised and used in the laboratory for true scientific testing. A decade later, Sato secured patents for Kaatsu in Japan. Soon after patents were gained in England, Germany, France, Italy and the United States.

But When Did It Become Popular?

In 2005, Sato and others founded the *International Journal of KAATSU Training Research,* which first helped to popularise Kaatsu among the general sport science community. Two years later, the Kaatsu Training Research Institute was founded to further spread word on Kaatsu.

For the general lifting community, Kaatsu began to appear some time in the early 2000s. In 2005, Iron Man magazine published a brief article on Kaatsu training. Three years later, the late Charles Poliquin was asked to comment on it. His

response was emblematic of many within the fitness community at this time

Q: Have you read anything about this occlusion training stuff ("*Kaatsu*"), where blood supply is cut off when lifting? Seems to be the rage in Japan.

A: Yes, and occlusion training is about as useful as tits on a bull.

How convenient is it anyway? You need an occlusion suit or bands that restrict blood flow while you lift. You block and release blood flow, going back and forth. They claim it gives you more hypertrophy, but the studies were done on untrained subjects.

It's very gimmicky. If I make you do ten sets of five on the deadlift, you're going to grow whether you're wearing an occlusion device or not. No need to buy an anaconda to wrap around you when you deadlift.

Despite what people believed, Kaatsu/occlusion/blood flow restriction training began to appear on major fitness and bodybuilding websites with a much greater regularity from 2009. As Jacob Wilson's 2018 article on Kaatsu correctly notes, the last three years in particular have seen a much greater online interest develop in Kaatsu. The reason? I suspect the rise of YouTube fitness channels has played a large

Dr. Sato as a Young Man.

role. Coupled with this Kaatsu bands have also become a much easier thing to purchase and use. It has come a long way from the old bicycle tubes Sato used to use on himself.

But Should You Kaatsu?

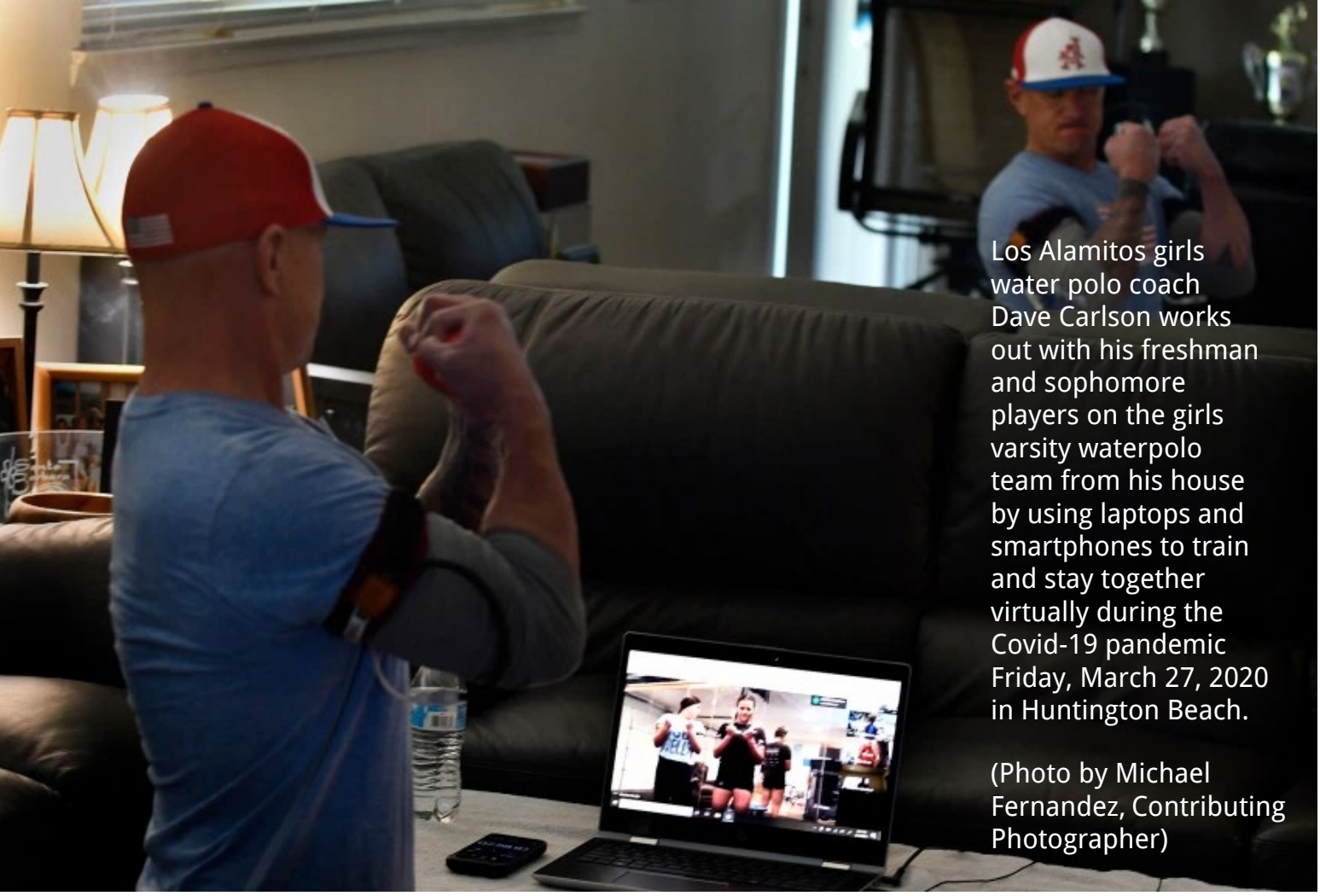
On this point I'm in two minds as I've used Kaatsu incorrectly and correctly. The first time I used blood restriction training was an unmitigated disaster. I attached the bands far too tight, left them on for far too long and gave myself an almighty scare when I thought I'd developed varicose veins in my calves. Yes I overreacted but if you're going to do something wrong, go all in.

Now the second time, was a far more pleasant experience, at least in terms of using the bands. It was done alongside a friend of mine who is a trained physiotherapist (I wasn't taking chances this time!) and resulted in a pretty intense workout. I did this for roughly eight weeks for pretty much every muscle group. The weights used were far lighter than my regular training but the effects were the same if not slightly better owing to the new training stimulus.

Would I do it on a regular basis? Probably not as I enjoy just going to the gym and lifting. Anything that requires more effort than that I usually discard after a few weeks. Where I would and do use Kaatsu is when I'm coming back from an injury and need to use light weights and focus on form. After some knee trouble late last year I had to back off from squatting and a lot of knee flexion for a while. Kastsu bands and high rep leg presses meant that I kept most of my muscle mass, however meager it may be.

The other occasion when I use Kaatsu is when I'm traveling and have access to a gym with light weights or have no gym access whatsoever. In these scenarios a combination of Kaatsu, a resistance band and a combination of body weight exercises means a good workout is never too far away.

For those interested in the science behind Kaatsu and its applications, rather than the ramblings of a historian, The Fitness Network provides an excellent summary here.



Los Alamitos girls water polo coach Dave Carlson works out with his freshman and sophomore players on the girls varsity waterpolo team from his house by using laptops and smartphones to train and stay together virtually during the Covid-19 pandemic Friday, March 27, 2020 in Huntington Beach.

(Photo by Michael Fernandez, Contributing Photographer)

KEPT FROM THE WATER AND EACH OTHER, LOS AL HIGH TEAM STILL STAYS COMPETITIVE

THE ORANGE COUNTY REGISTER

By Greg Mellen

One by one the faces appear as the Los Alamitos High students prepare for water polo practice.

Before you get the wrong idea, they are not breaking the shelter in place mandate. Rather, the players are gathering virtually on a video conferencing platform for their four-times-a-week workout sessions that would have normally been scheduled for sixth period swimming.

The girls workout with Kaatsu equipment, consisting of arm and leg bands that modulate blood flow to muscle groups and provide an intense, strenuous workout in a short time period.

As important as the exercise, is the concept of staying together and maintaining team unity and cohesion while schools and teams are shut down by the novel coronavirus pandemic. The decision was recently made that students will finish the year via virtual learning.

The practices have become something of a social and athletic lifeline.

“I think this is good for the team bonding together and staying in shape,” said Jennifer Connelly, a sophomore attacker on the team and the first girl to log-on to a recent afternoon

workout. “Obviously we talk together on social media, but it’s not the same.”

“I feel we’ve gotten closer during this pandemic,” said Lindsey Harris, a sophomore center. “I work out individually, but it’s not the same. This brings a different level of competition, it’s not just for yourself, but for these girls.”

Although schools and teachers are offering remote teaching in academic classes, re-creating the communal nature of team training is somewhat novel.

“Having this is not only good physiologically, but it’s even more important psychologically,” said Steven Munatones, whose twin daughters, Sydney and Sofia, are sophomores on the team.

“Especially teenage girls. They’re the most social beings on the planet,” he said. “We have to substitute that with something,.”

Munatones, the CEO and co-founder of Kaatsu Global, whose equipment and methods the team uses for workouts, first suggested the online concept to Dave Carlson, the longtime girls water polo coach at Los Al, who conducts the hour-long sessions.

He worried about the effect of the shuttering on athletes, many of whom depend on the regimen of

Los Alamitos girls water polo coach Dave Carlson speaks to his freshman and sophomore players on the girls varsity waterpolo team from his house by using laptops and smartphones to train and stay together virtually during the Covid-19 pandemic Friday, March 27, 2020 in Huntington Beach.

(Photo by Michael Fernandez, Contributing Photographer)

Los Alamitos girls water polo coach Dave Carlson speaks to his freshman and sophomore players on the girls varsity waterpolo team from his house by using laptops and smartphones to train and stay together virtually during the Covid-19 pandemic Friday, March 27, 2020 in Huntington Beach.

(Photo by Michael Fernandez, Contributing Photographer)

exercise and gathering in a team atmosphere for a feeling of normalcy.

At 2 p.m., Carlson switches on the Google Hangouts Meet application on his computer and the kids begin to filter in.

Carlson gives the girls 15 minutes to chat and catch up before getting down to work.

“Guys, I’m trying to convince my dad to get a puppy,” team member Ashley Hearen says. “My mom and I have been working on him.”

“I like the way your scrunchy matches your arm band,” one player tells another.

And with that, a torrent of discussion is unleashed in the way only high school girls can communicate.

Later, after some cajoling, Carlson is finally able to get the girls to concentrate on the workout, in which he also participates.

Soon the sounds of grunts and arghs punctuate Carlson’s instructions.

“Holy nuggets,” one girl yells out after a particularly grueling set of tricep dips

After practice, the girls thanked Carlson for working to keep them together and focused during the time off.

“Carlson looks after us like no other coach,” Harris said. “Even though we’re technically in swim season, he really cares about us.”

Now, although the pools are unavailable and players can’t scrimmage or work on game situations, the workouts are important to ensure they are in top shape when they can get back together in the water.

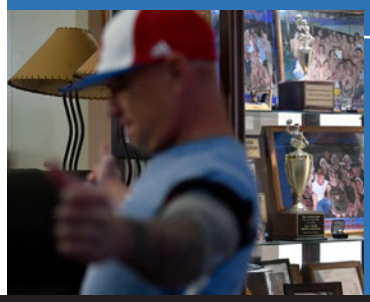
“We’re losing the feel of water, those are things we don’t have control over,” Carlson said, adding that what the team can control is its conditioning.

“I think it will give us a leg up,” Harris said of their competition season next winter. “Every other team is just at home not doing anything. When we get the chance (to return), we’ll already be in better shape.”

Los Alamitos girls water polo coach Dave Carlson works out with freshman and sophomore players on the girls varsity waterpolo team from his house by using laptops and smartphones to train and stay together virtually during the Covid-19 pandemic Friday, March 27, 2020 in Huntington Beach.

(Photo by Michael Fernandez, Contributing Photographer)

Surrounded by cabinets full of trophies, Los Alamitos girls water polo coach Dave Carlson speaks to his freshman and sophomore players on the girls varsity waterpolo team from his house by using laptops and smartphones to train and stay together virtually during the Covid-19 pandemic Friday, March 27, 2020 in Huntington Beach.



(Photo by Michael Fernandez, Contributing Photographer)

EXERCISE COMPANY FINDS ITS FLOW

THE ORANGE COUNTY REGISTER

By Greg Mellen

Matt Paz looks every bit the part of a physically fit gym owner and personal trainer as he begins to demonstrate a new exercise device.

But within 10 minutes, the muscular triathlete is grunting and grimacing. His veins are popping and his biceps are inflated as he struggles through several sets of curls – with 2-pound weights.

This is what can happen when people work out with Kaatsu – even for the owner of the Huntington Beach gym HITS, which stands for High Intensity Training Studio.

So what is it about the benign-looking set of exercise equipment – consisting of arm and leg bands that can be inflated to moderate blood flow, much like a blood pressure cuff – that can have a guy like Paz panting in mere minutes?

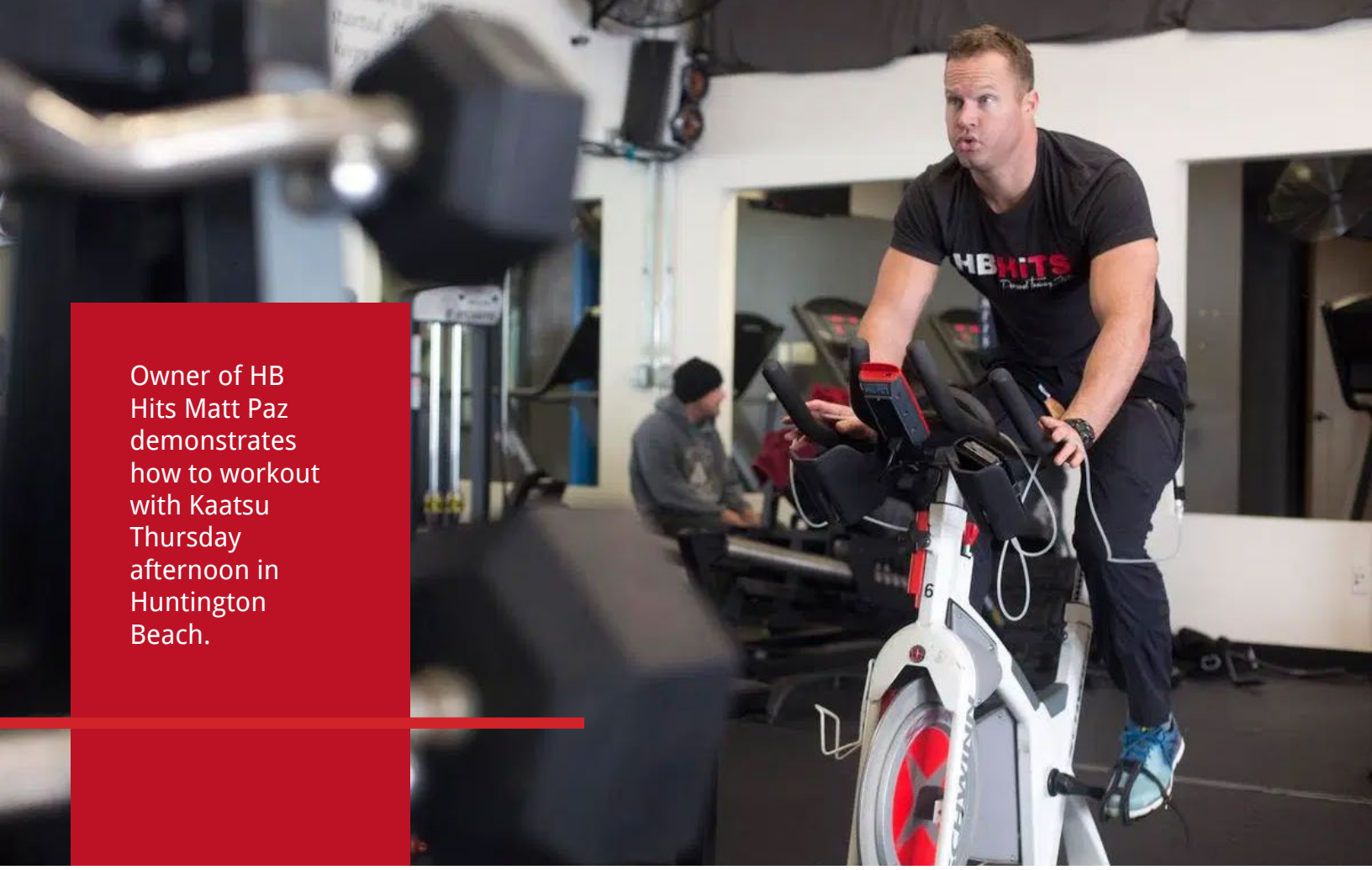
The trick, so to speak, of Kaatsu is that as tubes within the bands are inflated, they slow blood flow, which engorges limbs with blood, raises lactic acid and expands capillaries, according to exercise experts. That makes the brain think the muscles have been through a strenuous workout.

Steven Munatones and Richard Herstone, owners of the recently launched Huntington Beach company Kaatsu Global Inc., said the system intensifies and accelerates workouts, builds muscle, adds elasticity to veins, improves balance and speeds healing.

If the two are correct, Kaatsu, which until recent years was used primarily in Japan, could be joining weights, exercise balls, treadmills and exercise cycles in numerous gyms. They also hope to see the equipment in professional sports locker rooms, rehabilitation centers, hospitals and nursing homes in the coming years.

“I call it a generic device because it’s for everybody,”

HITS owner Matt Paz demonstrates how to work out with the new Kaatsu exercise device Jan. 7 at his Huntington Beach gym.



Owner of HB Hits Matt Paz demonstrates how to workout with Kaatsu Thursday afternoon in Huntington Beach.

said Herstone, the chief operating officer.

Paz, who is subleasing space in his gym to Kaatsu Global, testifies to the system's effectiveness. Just two weeks removed from shoulder surgery, Paz said working out with the device has accelerated his healing and kept him from losing muscle mass.

"I'm a gym owner and I have to look the part," he said.

Although blood flow restriction training, or occlusion, has been used for many years, particularly among bodybuilders, it is often practiced without being regulated or properly monitored, which can have adverse effects, according to studies.

If wraps or bands are cinched too tightly, users risk rhabdomyolysis, which causes damage to muscle cells and can lead to kidney failure.

Munatones, the company president, said Kaatsu is different because it has been designed with countless variations tailored to individual needs and goals. Rather than using terms like occlusion or blood flow restriction, the founders of Kaatsu Global call their method blood flow "moderation."

In Japan, Dr. Yoshiaki Sato, 67, discovered the method as a teenager in 1966 while trying to relieve pain and numbness in his calves while squatting during a religious exercise. Over the years, Sato refined his system, experimenting on himself using tubes and bands at different pressures and observing the results.

When Sato first began using Kaatsu publicly, it was as a tool to help in rehabilitation for the elderly to prevent muscle atrophy.

In the United States, however, the equipment and training caught on with elite athletes in the U.S. Ski and Snowboard

Owner of HB Hits Matt Paz demonstrates how to workout with Kaatsu Thursday afternoon in Huntington Beach.

Association and USA swimming. U.S. Nordic combined skier Todd Lodwick used it to recover from injuries before the 2014 Olympics in Sochi, Russia. Major League Soccer goalie Josh Saunders, who nearly lost a leg to a bone infection after knee surgery, also used the device in his recovery.

And gold medal skier Bode Miller, who has used Kaatsu to rehabilitate from leg injuries, told the Military Times that Kaatsu was "the most revolutionary training methodology I've ever seen."

Beyond the anecdotal evidence, Kaatsu is the subject of scientific studies seeking to determine its efficacy and possible uses at such universities as MIT and Harvard.

Kaatsu Global, which filed as a foreign corporation in California in January 2015, already is selling in 27 states and 17 countries and has built a client base of more than 500, ranging from doctors and scientists to corporations, gym owners and professional and Olympic sports programs, Herstone said.

Munatones stumbled onto Kaatsu, which translates to "additional pressure," by coincidence. He was with the U.S. swim team in Japan in 2001 as a coach and translator when a Japanese translator introduced him to Dr. Sato.

"I went to his clinic and I was blown away," Munatones said. "I asked him, 'Why isn't this in the United States?' He said, "Because I don't speak English and I don't travel.'"

The introduction led to about a decade of visits and learning for Munatones, who likened the experience to "The Karate Kid," in which Ralph Macchio as Daniel is taught by Pat Morita's Mr. Miyagi.

The components for a Kaatsu system, which include the straps, tubing and a control device that also tracks and records a variety of data, are made and assembled in the U.S. as part of the company's agreement with Sato. The cost ranges from $2,100 for a personal unit to $4,795 for a clinical or professional unit. There is also a swim training model for $3,000.

"But the real value is in the protocols and training," Munatones said. "Everyone who purchases (a Kaatsu system) has to go through training to understand the safety protocols."

Part of the beauty of the product, according to the spokesmen, is that it is of equal value to someone like Paz, who is young and fit, or Herstone, who is in his 70s and has three stents in his heart.

He said he has used the device at his desk, doing simple exercises for short amounts of time, and has seen marked improvement in his overall health.

"Try it once; you'll feel it immediately," he said.

Why Celebs and Athletes Are Embracing Blood Flow Restriction Training

Men's Health

By Lindsay Berra

Science shows that this niche lifting technique can build muscle and speed healing-if you do it right.

DO REPS OF any exercise with a challenging weight (something beyond 65 percent of your max) and the muscles you're working contract so tightly that they trap blood within them, preventing that blood from returning to your heart. This restriction of blood fatigues your muscles and leads to lactic acid buildup, which, eventually, pushes your body to "adapt" by building tougher, stronger muscles.

It's the mythic, muscle-building "pump," and it relies on heavy weights. That's why most strength workouts encourage you to lift as heavy as you can. But what if you could skip all those ultra-challenging loads and instead get superhero body benefits by tightening a few velcro bands around your thighs or upper arms?

That's the promise of Blood Flow Restriction training. Once a niche method found only in the meatheadiest of bodybuilding gyms, it's now being embraced by Hollywood A-listers, pro athletes, military personnel, and garage gym junkies alike. With everyone from Mark Wahlberg to Lakers star Dwight Howard on board, it's the stuff of bro-science infomercials, except it's actually backed by legitimate research -- and has more uses than muscle-building.

When done properly, with a device that properly monitors and maintains the pressure being put on your arteries and veins, and the blood flow within them, BFR can increase muscular strength, hypertrophy, and endurance with 30 percent of your max weights (much less than you'd use in a typical strength sesh), according to 2019 research published in Frontiers in Physiology. All you have to do is restrict blood flow to your legs or arms.

The History of BFR

THE PROCESS was first unlocked nearly a century ago -- and had nothing to do with building muscle. The first known study on BFR, published in the Journal of American Medicine in 1937, saw doctors use it to regenerate tissue and increase walking capacity in patients with lower-body circulation disorders.

Twenty-nine years later, Yoshiaki Sato, Ph.D., M.D., a Japanese weightlifter, sat in an hours-long Buddhist ceremony in the "Seiza" posture, thighs folded onto shins. When he stood, he felt his calves throbbing. Just 18, he theorized this pump was due to restricted blood flow and spent the next 40 years working to recreate the feeling by wrapping his muscles with bike tire tubes, ropes, and judo belts, with uneven success.

It wasn't until he attached pneumatic bands to a digital control system that he could consistently and accurately monitor pressure and restrict blood flow. He dubbed his machine the Kaatsu (Japanese for "additional pressure"), and it remains one of just a handful of tools that effectively track blood flow. These tools cost serious coin (the Kaatsu runs $899, and the Delfi units used by NFL teams cost as much as $5,000).

Internet message boards claim you can DIY your own bands, skipping precise tracking, but experts caution against that approach. At worst, you'll tighten the bands too much, risking permanent nerve and vascular damage. Leave them too loose and, all you're really doing is lifting with too-light weights. "You're probably not occluding to or maintaining the right pressure," says Dr. Adam Anz of the Andrews Institute for Orthopaedics & Sports Medicine in Gulf Breeze, FL. "You have to maintain venous compression in order to get a systemic response."

How Exactly Does Blood Flow Restriction Training Work?

KEEPING BLOOD from escaping back toward your heart makes BFR work. Deoxygenated blood is trapped in the muscle. New, oxygenated arterial blood traveling toward the restricted muscle stagnates and creates excessive pressure. Muscle cells overflow with blood, generating the "pump". As oxygen dissipates, lactic acid pools within these muscles, triggering the same total-body fight-or-flight response you'd feel when doing, say, a max-effort squat set -- and driving a release of muscle-building proteins and hormones, including HGH and insulin-like growth factor (IGF-1). That means you get a "bloom" of those muscle-building metabolites all over your body, not just in the muscle you're targeting with BFR.

But there's a catch. While working with lighter weights spares your joints, it prevents ligaments and tendons from developing resilience, says Tyler Opitz, DPT, SCS, CSCS, also of the Andrews Institute, which is studying the cellular response to BFR. That limits your ability to use your newfound muscle.

"Beach muscles look great, but if you want your connective tissues to be able to handle a load," says Opitz, "whether it's a heavy squat or a heavy suitcase, you need to load them."

This Isn't Just For Beach Muscle

BLOOD FLOW restriction training is actually at its best away from the big-arms crowd (see sidebar), when used by those coming back from injury, as Johnny Owens, MPT and owner of the BFR company Owens Recovery Science learned in 2011. While at the Center for the Intrepid, a Department of Defense rehab facility in San Antonio, Owens started using BFR to help blast injury victims build muscle without traditional weights. All showed dramatic increases in power and strength.

"We called some researchers looking into it in academic labs," says Owens, then CFI's chief of human performance

optimization. “One of them point-blank said, ‘I don’t know what has taken you guys in rehab so long to accept this concept.’”

Now, pro teams like the New Orleans Saints use BFR regularly to rehab injured players. No, you can’t lift heavy weights with a torn ACL, or a cast on your arm. But you can still pick up light dumbbells, and that’s all Beau Lowery, Saints director of sports medicine, needs to help you retain strength. “Because of the increase in growth hormone and other hormone levels, even if a guy is in a cast or immobilized, we are able create muscle hypertrophy,” he says.

The gain is not without pain, however. Done effectively, Lowery says the pressure that builds up during BFR often leaves Saints linemen in tears, and at the Andrews Institute, Opitz says employees opted out of early BFR studies simply because the process was too painful. So before you test-drive this cutting-edge training method, best seek the guidance of a pro.

But there is a future for BFR, even if it’s not in your home gym.

The Best Ways to Use BFR

HEAVY WEIGHT training remains your best path to muscle, but if you can afford a BFR machine, supercharge your size by using BFR in these situations.

On lightweight training days

Once a week, ditch heavy weights. Pick 3 strength exercises. Start with a set of 30 reps for each motion, then do 3 sets of 15 reps each. Rest 30 seconds between sets.

On recovery days

Think you’ll be sore from today’s leg blast tomorrow? Lie down with cuffs tightly wrapped on your upper thighs and fully occlude blood flow for 5 minutes. Allow normal blood flow for 5 minutes; repeat 3 times.

As a finisher

Do 4 sets of a heavy bench press. Then grab light weights, attach the BFR cuffs, and do an isolated triceps move. Do 30 reps the first set, 15 in the other 3 sets. Enjoy the muscle--building burn. Do this at the end of your workout.

METS' NOAH SYNDERGAARD TALKS NEW WELLNESS ROUTINE AS HE NEARS RETURN

yahoo!sports

By Danny Abriano

Noah Syndergaard fires a pitch during a bullpen session at 2021 spring training

Mets right-hander **Noah Syndergaard** is expected to soon begin a rehab assignment as he nears a return from Tommy John surgery.

And Syndergaard, who missed the entire 2020 season while recovering and working his way back, has embraced a new wellness routine along the way.

Syndergaard's routine includes using a hyperbaric chamber.

He's also gotten into "earthing."

"I'm really big into grounding, or earthing, which is basically standing barefoot and making a connection to the earth. Sounds kind of like witchcraft, but I believe the science behind it," Syndergaard told GQ in a recent interview. "I just got done doing some BFR, blood flow restriction. I've got some KAATSU bands which I like to put on my arms, and I'll just Swiffer or sweep the floor for a good bit. It gets me a nice pump and it's a good recovery flush."

As far as his diet, Syndergaard has been eating heart and liver most days.

"It's as ancestral for us as it gets," Syndergaard said. "As hunters gatherers that's what we were eating. We're not respecting the animal if we're just eating the parts that we want to eat for the hell of it."

Asked whether all of his new routines are contributing to how good he feels on the mound, Syndergaard said:

"I hope so. I like to think all this stuff is really helping out. I guess there's really no way to tell. I want to be at the end of my career and be like, 'I did everything I possibly could to make sure that I put my body and myself in the best position to succeed and be the best person I can be.'"

If all goes well, Syndergaard will be back in the Mets' rotation around mid-June, roughly four months before he is set to hit free agency.

Willie Banks at Home:

Two-Time Olympian Leaping into Leukemia Society Work

TIMES of SAN DIEGO

By Ken Stone

Willie Banks was ranked second in the world in 1980 but lost a chance for Olympic gold in the triple jump because of the U.S. boycott of the Moscow Games. Forty years later, the one-time world record holder is again robbed of glory.

The Tokyo Olympics, which he would have **attended as a member** of track and field's world governing body, has been **delayed until July 2021**.

It's especially painful since he has many ties to Japan. His wife is a native of Nagoya. And his sports management and consulting business (**with a website** in Japanese and English) has done a lot of business in the Land of the Rising Sun.

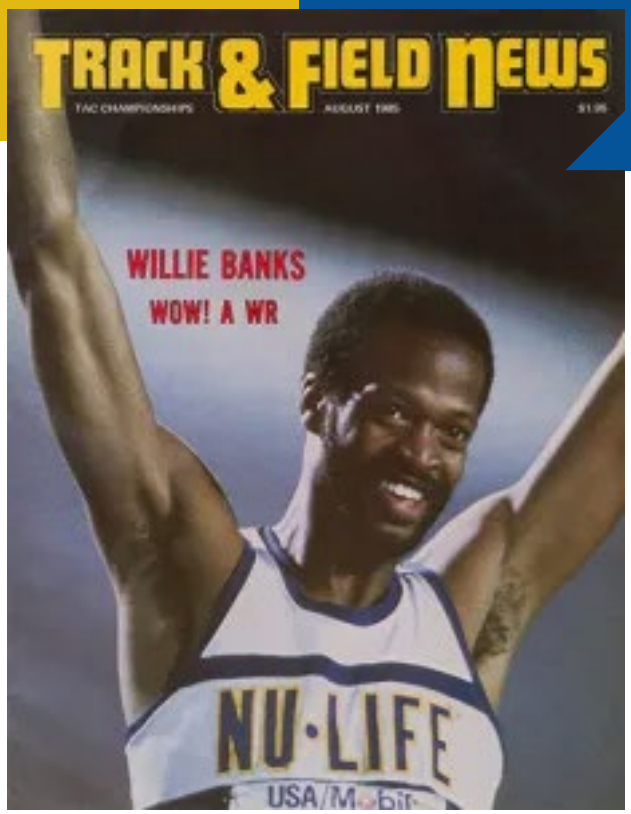
In February, the two-time Olympian (1984 and 1988) was in Japan — and also made trips to Pocatello, Idaho, and New York City. Then came coronavirus.

Banks, a Carlsbad resident who starred at Oceanside High School and UCLA, faces the same circumstances as many around the world. Hunkering down at home, reaching out to friends.

Here's our email chat with Banks, a member of the **National Track & Field Hall of Fame**.

Times of San Diego: How are you working during this pandemic? What telework tools are you using?
Willie Banks: Fortunately for me, I always work at home. I have all the necessary telecommuting equipment I need but I have had to add some software. The pandemic has done a lot for my "honey do list." I picked the oranges and lemons on our fruit trees, I installed an antenna for our TVs so we can get free over-the-air channels, and fixed some leaking pipes that needed my unprofessional attention.

Amid the pandemic, two-time Olympian Willie Banks is doing Zumba to stay in shape.
Photo by Hitomi Banks



Willie Banks set a triple jump world record of 58-11½ in 1985. Image via Track & Field News

Every day I receive hundreds of emails to sift through, but that is down considerably because of the pandemic. I do most of my work internationally, so I am up night and day working. It is great to be able to work at home because I can be in my PJ's or sweatpants all the time.

One thing that has helped me through this scare is volunteering and giving back to the community. I have dedicated a part of this time to raise money for the **Leukemia and Lymphoma Society**. I have been asked to join a group of San Diegans to help raise money through a program called **Man and Woman of the Year**.

It is a unique program where each nominee is responsible for raising money in support of the nonprofit. I am trying to raise $250,000 this year. It is a heavy lift, especially during this time, but my sister passed away with leukemia last year and I am determined to do something extraordinary in her name because of the love and respect I have for her. This will keep me busy for the next 12-13 weeks.

I had travel plans for this part of the year, including the Olympic Games in Japan, but now I don't travel so I have a little cabin fever now. The effort for the Leukemia and Lymphoma Society is helping me to stay focused on something much bigger than me!

How many in your household — number of kids and adults? How are you all getting along?

My wife and I share our home. My adult son and I were in Japan two weeks ago, so we had to self-quarantine [and] as a consequence my son is staying here now because he doesn't want his wife to be infected, if he has it. It has been two weeks now, so I am trying to get him to go home. I think he likes being pampered by his mom.

I think the fact that people have to spend time together is doing good things for my family. Also, I see so many people together walking and taking their dogs out in my neighborhood, I think it might be a good thing for marriages (and for dogs!).

Willie Banks is dedicating time to Leukemia and Lymphoma Society, inspired by his late sister Thelma.

Photo by Ken Stone

How are you getting food and other necessities? How often do you personally go out, or are you taking delivery mostly?
We get our food the old-fashioned way — we grow it or we go to the market and purchase it. Right now there are two excellent cooks in the house, not including me. I am getting fed really well and I am enjoying my son's cooking talent, which I didn't know he had. I know my daughter-in-law must miss his meals. I know I will miss them!

Personally, I go to the market about twice per week. Often, I have to drive to San Diego to the Asian markets to find things that you can't find in the local markets. It seems that the Asian markets are well-stocked for some reason.

Aside from official local, state and government channels, how are you getting news about the outbreak? How much social media do you use?
I get many newsletters and I listen to international news, especially from Japan, my wife's home country. We hear about the progress of the outbreak and we worry that people are not being smart about social distancing. We worry that the effort is not being enforced seriously enough to push people to take the measures necessary to blunt the virus.

I try to be positive and pray that people will adhere to the stringent rules, but sometimes when I see the errors that are often made, I find it hard to comprehend how this will ever end. However, I remain positive.

I read blogs, Facebook, Twitter, Instagram and Reddit. But mostly, I listen to the radio or I read the news on outlets like the Times of San Diego to keep track of the spread of the virus. I like to watch or listen to Governor Newsom's and Governor Cuomo's press conferences. I also listen to the press conferences by the CDC to get my facts about the outbreak in the U.S.

How do you ward off negative emotions — fear, anxiety, depression? What steps are you taking to preserve mental and physical health?
Fortunately, I don't have too much anxiety, although I have had a few skips of my heart lately that have concerned me. I try to keep active at home. I cleared a place in the family room so that my wife and I can do our workout. My wife is a big fan of **Jazzercise**, so she takes one or two online classes every day.

I love to do **Zumba**, so I do my class several times each week along with walking the neighborhood and using a new product called **Kaatsu**, to gain strength and repair injuries. So far, everything seems to be working. I have been able to lose weight and gain muscle mass with the exercises I am doing.

I am also using this time to learn some new things. I have just finished a course to become certified as an apprentice track and field official. It is something I have wanted to do for many years. And I finally did it!

What else do you want people to know about your own personal response to the outbreak?
I hope people will not think of the social distancing as a terrible thing. I hope people will turn this lemon into lemonade. It is important to remember to give generously of your time, talent and treasure. It is a time to get educated and be wise. It is a time to reconnect with your loved ones who you are cooped up with, or that can be contacted through the many video connections that we have through the internet.

It is a time to get fit and healthy. It is a time to make others feel good — and I hope that is what I can do.

Willie Banks, a new member of the World Athletics governing council, observed the Santee Olympic Trials in 50K race walk in January.

Photo by Ken Stone

considerable.

This easy workout might be the key to maintaining muscles as you age

No, it's not a robot that lifts for you. But this method for lightening the load could make exercising easier

By Charles P. Wallace

One of the least pleasant things about getting older is the tendency to lose muscle. Research shows that starts happening by the age of 40, and by the time you hit 80 you can have lost as much as 50% of your skeletal muscle.

This decline is known as sarcopenia, and in addition to reducing strength, it can affect things like balance and the ability to get out of a chair later in life.

But losing muscle is not preordained.

You can maintain and even restore your muscle mass by practicing regular resistance training, also known as lifting weights. You can regain muscle in as little as four months, research in older adults has shown, but exercise orthodoxy has always held that to build muscle you must exercise with heavy weights—70% to 80% of the weight that you can lift just once.

The biggest problem with this is not the science but the motivation needed to follow such a grueling regimen regularly. You may find the

Many of the benefits can be achieved simply by using the bands when you take a walk.

prospect of going to a gym crowded with gorgeous young bodies off-putting, and the prospect of lifting such heavy weights can be daunting.

Is there an alternative?
For the last year, I've been experimenting with a different kind of resistance training involving extremely light-weight workouts. It's called blood flow restriction training (BFR), and extensive research has found it to be as effective as lifting heavy weights.

Here's what you need to know.

The science behind the bands

Developed in Japan, which has the world's largest population of seniors, BFR consists of putting inflatable bands a bit like a blood pressure cuff on your arms or legs. You use a pump to inflate the bands to a specific pressure determined by a number of factors, such as the circumference of the limb.

With the bands in place, you do a very brief workout using extremely light weights — only 20% to 30% of what's normally needed to gain muscle. For example, I've been getting a great upper arm workout using BFR and hand weights weighing just two and a half pounds.

A 2017 study by researchers in Sao Paulo involving 23 men and women between the ages of 51 and 70 found that while high-intensity weight training produced the best results, BFR training with weights weighing one-fourth as much produced substantial gains in both strength and muscle mass. BFR "constitutes an important surrogate approach to high-intensity resistance training as an effective training method to induce gains in muscle strength and mass in elderly," wrote Carlos Ugrinowitsch and his colleagues.

Other research by scientists at Deakins University in Australia has found that many of the benefits of using BFR can be achieved simply by using the bands when you take a walk. What's more, they seem to help with problems like bone loss and arthritis.

Peter T. Lansbury, Jr., an associate professor of neurology at the Harvard Medical School and the chief scientific officer at drugmaker Lysosomal Therapeutics, told me he started using BFR bands five years ago when he developed inflammatory arthritis in his arms and couldn't even lift a large carton of milk.

"It got me over a huge hump," says Lansbury, who is now 60 years old. "My strength has really improved."

What's going on with BFR

How do the bands work?
I spoke with Jim Stray-Gundersen, a sports medicine doctor in Park City, Utah,

Like all resistance training, BFR carries risks if done improperly, mainly bruising or dizziness.

who works with the U.S. and Norwegian Olympic teams. He notes that the bands collapse the veins directly beneath them in your arms and legs, creating a kind of valve. When you exercise, that pushes the blood past the valve back toward the heart.

"The bands slow down the delivery of oxygen so that the working muscle cannot keep up, creating a bit of a crisis in the muscle," Stray-Gundersen explains. "Our brains end up releasing a bunch of hormones, including growth hormone, that pours through the whole body, and that is the mechanism with which we are able to rapidly improve the size and strength of muscles, build new blood vessels, and actually strengthen bone."

Like all resistance training, BFR carries risks if done improperly, mainly bruising or dizziness. In fact, Lansbury recommends getting some type of training in how to properly attach and inflate the bands as well as how to work out with them before trying them. (More on that below.)

Plus you need to know the difference between occlusion—blocking the blood flow to your arteries—and BFR, which should employ only moderate pressure that just slows the blood in your veins. Some bands on the market use occlusion, which could be dangerous and won't give you the benefits associated with BFR.

How to get started

I've been working with two systems that use inflatable bladders in the bands to apply just a measured amount of pressure. The first, developed in Japan by a medical doctor named Yoshiaki Sato, is called KAATSU, which means "additional pressure" in Japanese.

The KAATSU system has been extensively studied in Japan. For example, a group of researchers at Tokyo Metropolitan University achieved between 7% and 10% increases in strength after two weeks of twice daily workouts.

At $2,100 for the KAATSU Nano I have been using, KAATSU is not cheap. One advantage of the high price is that a course on using the bands is included. In addition, you'll find a large network of KAATSU trainers in the U.S. who can come to your home for lessons and workouts.

A second, much more affordable system called BStrong has been developed by Stray-Gundersen, who formerly worked with KAATSU. Instead of an electric pump guided by a small computer, which the KAATSU system has, BStrong uses a small hand pump much like you find with blood pressure devices. It relies on a smartphone app, online videos, and a user's guide instead of a separate device. With four bands, BStrong sells for around $300.

I've found both systems give me a great workout, including that "pump" you get from lifting heavy weights. In addition, there is an added sensation that feels like your skin is momentarily itchy. That's a sign that blood is really flowing in your smallest capillaries.

If you're looking to start a little slower, you can get a 4 pack of BRF bands on Amazon for under $30.

BLOOD-FLOW RESTRICTION TRAINING NOT SOMETHING FOR THE FAINT-OF-HEART

stuff

By Stephen Heard

THE BASICS

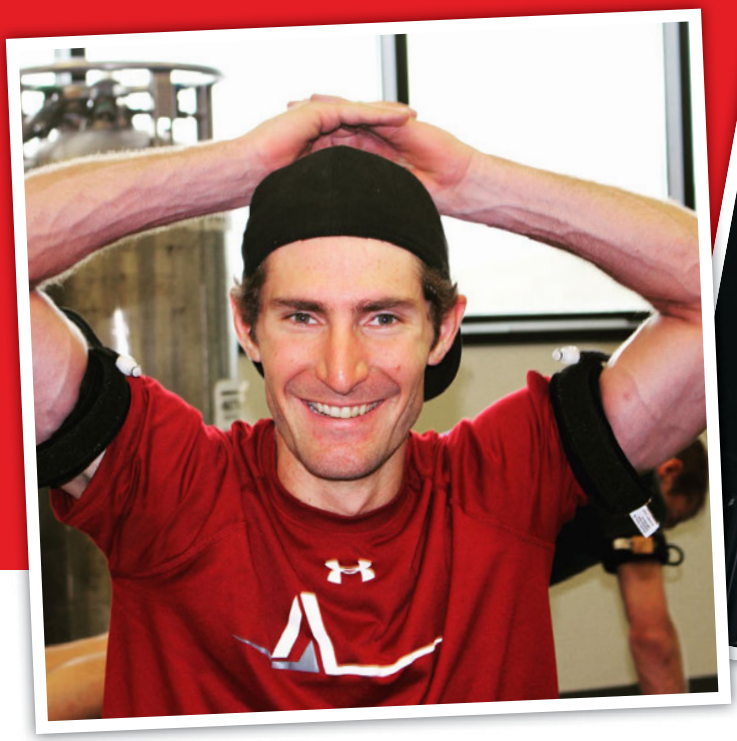
The journey to bulging gains can be confusing, with countless tools and techniques available to help gym-heads achieve that swollen look.

Blood-flow restriction training is one particular method gaining traction in weight rooms for its ability to increase muscle size and strength. Also known as occlusion training or Kaatsu – a Japanese term meaning "added pressure" – it involves wrapping limbs to restrict the flow of blood out of the target muscle. That vein-popping technique is said to help rally the chemicals required to stimulate muscle growth and create extreme muscle fatigue in half the amount of time.

GIVING IT A BASH

There are several ways to wrap your limbs for blood-flow restriction (BFR) training, from specific inflatable pressure cuffs and medically approved tourniquets, to everyday strips of material.

The important stuff to remember is that you should use legitimate equipment and shouldn't wrap-up too tightly and completely shut-off circulation to the working muscle – something



which can apparently decrease muscle growth. With thick cuffs secured at the top of my legs and arms, I entered the weight-room in what looked like an unfinished Halloween costume.

To increase muscle size and strength, it's recommended that BFR is performed with very light loads – at an intensity of 20 to 30 per cent of your one-repetition maximum. Beginning with light weight across a series of single-arm bicep curls, the pressure gradually boiled to the point where my arms felt like they were going to explode. The discomfort seemed to linger longer than the average weight session, prompting drawn-out rest times between sets. It wasn't long after that the arm-cuffs were ditched completely. Knee extensions proved more successful – perhaps due to looser wraps – with the pressure not as quick to build into throbbing flesh. Regardless, it's still an uncomfortable experience. The no-pain, no-gain philosophy rings true with this one.

WHY YOU SHOULD TRY IT

This one is best-suited to experienced gym-goers looking to introduce a different form of training. That said, blood-flow restriction can be used in resistance and aerobic-training, as well as low-impact exercise like walking and rehabilitation. There are several studies which support the use of blood-flow restriction to increase muscle size, strength and endurance.

RISK RATING

As the intimidating name suggests, blood-flow restriction training is not something for the faint-of-heart. Looking at safety issues with blood-flow restriction, a review by the *Scandinavian Journal of Medicine & Science in Sports* confirmed that, when performed in a controlled environment, it is "a safe training alternative for most individuals, regardless of age and training status".

Professional guidance should be sought with the application of blood-flow restricting equipment – makeshift wraps may increase the risk of soft-tissue damage. Those with circulation and blood-pressure issues should consult their GP first.

Blood flow restriction emerges as the hot new fitness trend among Olympians

THE IRISH TIMES

Developed by ex-power lifter in 1966, the practice may help athletes recover quicker

Every four years, the Summer Olympics shows the world the latest training or recovery method the greatest athletes have taken up. In 2016, many swimmers had red circular marks on their skin from "cupping," an ancient Chinese practice involving suction on sore muscles and tendons. This year, the hot thing appears to be tourniquets. No, there is no outbreak of cuts. But American swimmer Michael Andrew is wearing tourniquet-like bands in the practice pool. Galen Rupp, the defending bronze medallist in the marathon, sometimes straps similar bands to his legs while training.

They are among the elite athletes who have become disciples of a practice known as blood flow restriction, which is exactly what it sounds like: cutting off blood flow to certain muscles for limited periods to both enhance the effects of training and stimulate recovery.

The practice has come into vogue in time for the Tokyo Games, and a Japanese former power lifter named Yoshiaki Sato, who developed it in 1966, is finally having his moment. Sato (73) has been honing the technique and spreading its gospel for most of his adult life, building a small fortune in the process as a Japanese version of Jack LaLanne. He has created a practice and a series of products called Kaatsu that are geared toward blood flow restriction. Sato still practises blood flow restriction every day, and now marvels at the attention it is getting.

Caeleb Dressel and Michael Andrew react after competing in the Men's 50m freestyle final at US Olympic team swimming trials last month.

Photograph: Maddie Meyer/ Getty Images

> For Andrew, the most important part of the technique may be how strongly he believes it works. As every sports scientist knows, placebos can often be as strong as any drug.

'Live high, train low'

"It was always just a matter of time," he said this month in an interview from his home in Fuchu, a suburb of Tokyo. "I just did not think it would take this long." In recent years, blood flow restriction gained an important advocate across the Pacific in Dr Jim Stray-Gundersen, a physician and sports medicine researcher who has worked closely with Olympic organisations in the United States and in Norway.

He essentially created the "live high, train low" approach to altitude training, which prescribes athletes sleeping and living above 8,000ft to increase the production of oxygen-carrying red blood cells, then descending a few thousand feet to train in order to avoid overtaxing the body.

Stray-Gundersen trained with Sato earlier in the past decade and became known as the "Kaatsu master" before the two parted ways. Stray-Gundersen then created his own blood flow restriction methods and a company, B Strong, in 2016. "You can get the benefits of swimming 10,000 yards by swimming maybe a thousand," he said recently. Andrew (22), a rising star who will swim three individual events and participate in relays in Tokyo, said he first started experimenting with blood flow restriction five years ago at the urging of Chris Morgan, a veteran swim coach.

He often straps the bands on to his arms for 25-yard sprints and tries to achieve the same times as when he is not wearing them. "Obviously, it's very difficult," Andrew said in an interview this month. "But you are simulating a sensation of real pain that tricks the body into regrowth." The swimmer entered a small business relationship with Sato's company after years of using its products. (If a customer uses Andrew's code, Kaatsu donates 20 per cent of the sale to Andrew's swim club.) Before and after training and races, Andrew straps a gadget high on to each leg, then increases and decreases the tension of the tourniquet at regular intervals – think of a blood pressure cuff – to stimulate blood flow and recovery. Sometimes he wears the bands in the ready room before heading out to the pool deck for a race.

Not everyone has jumped on the bandwagon. Dave Marsh, who has coached numerous swimmers to the Olympics and is directing Israel's team in Tokyo, said one of his athletes had used blood flow restriction for recovery and rehabilitation from injury, but he had yet to recommend it in training.

"The first job of a coach is to not do any harm," Marsh said. "It seemed to me that with blood flow restriction, it could lead an athlete to take a step backward." Like any good sports scientist, Stray-Gundersen wanted to see the data when a colleague told him that blood flow restriction was helping his athletes build muscle mass in two weeks that normally took six. As it turned out, there was a paper from 2000, published by Sato and scientists at research institutes in Japan, in the Journal of Applied Physiology.

Put simply, the paper argued, blood flow restriction prompted an outsize response from the brain to speed up the normal process of repairing and rebuilding damaged

tissue. Cutting off blood flow, then switching it back, can spur the brain to use more healing powers than it would normally think it needs. Since that study, a number of independent researchers have confirmed the potential benefits of restricting blood flow during exercise. Shawn M Arent, chair of the department of exercise science at the University of South Carolina, is currently conducting a study on its effects for the defence department.

Sacrificing fitness

He said early trends suggested that the practice might be most effectively applied when athletes wanted to dial back their training load without sacrificing fitness, either while tapering before competition or at the end of a season, while recovering from injury.

"It's a good supplement for training; it's not all of your training," Arent said. "It provides physiological stimulus when other things might be limited."

For someone like Andrew, who swims thousands of yards every day, or Rupp, whose regimen includes more than 100 miles each week plus weight training and core work, or New York Mets pitcher Noah Syndergaard, or champion skier Mikaela Shiffrin or any of the other top athletes who have started incorporating blood flow restriction, the technique allows them to reduce the likelihood of a repetitive stress injury and speed up recovery time.

For Andrew, the most important part of the technique may be how strongly he believes it works. As every sports scientist knows, placebos can often be as strong as any drug. "I did something like 18 races in seven days at the trials, and I felt fresh," Andrew said. "I'm sure it was because I was so disciplined with the recovery. I used it all the time."

Los atletas olímpicos y su truco japonés para tener más resultados al entrenar

By Paloma González

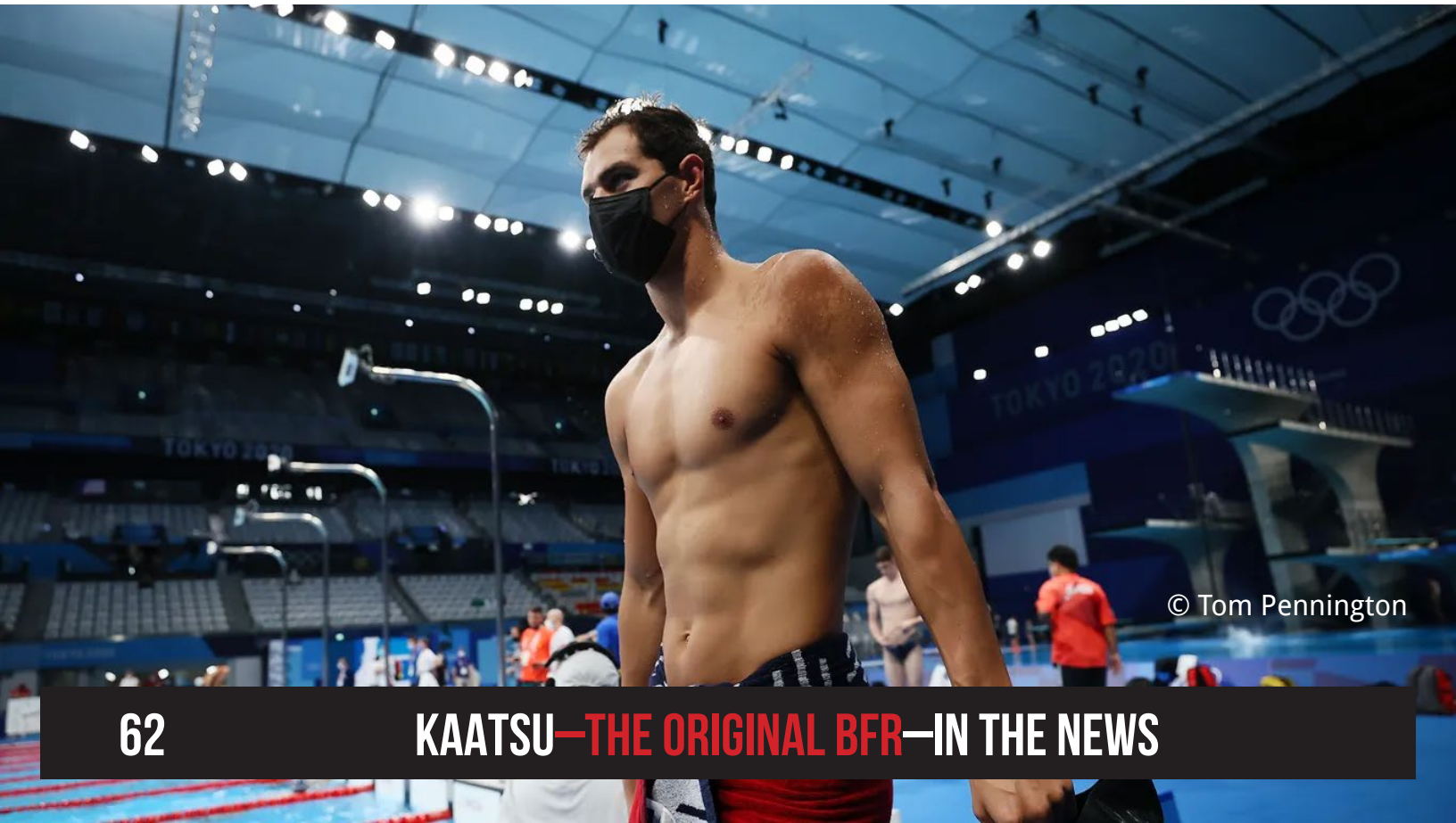
Los atletas olímpicos son unas bestias y su secreto está en usar una técnica creada por un levantador de pesas japonés.

Tokio 2020 reunió a los mejores **atletas olímpicos** del mundo en un solo lugar, donde han participado en competencias intensas en las que demuestran que no son humanos, o al menos que tienen la clave para ganar más músculo, fuerza y resistencia que los simples mortales.

Y es que los **atletas olímpicos** ni entrenan como el resto de nosotros, no quedan satisfechos con una rutina de 7 minutos ni se saltan la recuperación, de hecho, siempre están buscando nuevos trucos y formas de entrenar para ser cada vez mejores. En 2016, uno de los trucos fue la terapia de ventosas, que llevó a que varios nadadores aparecieran con marcas rojas y circulares por todo el cuerpo, como resultado de un método chino que supuestamente ayuda a tratar los dolores que surgen por los entrenamientos más intensos.

Obviamente, no todos los atletas olímpicos entrenan de la misma forma, deben tomar en cuenta sus deportes y lo que cada disciplina requiere, pero muchos de ellos toman técnicas similares para obtener los mejores resultados posibles.

Este año, la tendencia es un truco que fue creado por un legendario levantador de pesas japonés que consiste en "**restringir el flujo sanguíneo**", según explica el New York Times.



¿En qué consiste el truco japonés de los atletas?

"Este año, parece que lo que está de moda son los torniquetes", dice el Times.

Según reportes, el nadador **Michael Andrew** usa bandas que crean torniquetes mientras entrena en la alberca, mientras que **Galen Rupp**, una medallista del maratón, suele amarrar torniquetes en sus piernas mientras realiza sus entrenamientos.

Esto forma parte de una práctica, que fue desarrollada por el levantador de pesas Yoshiaki Sato en 1966, que se llama restricción del flujo de sangre y son muchos los atletas que la llevan a cabo mientras se preparan para sus competencias. La práctica consiste como su nombre lo indica, en **limitar el flujo de sangre a ciertos músculos por periodos cortos**, lo que ayuda a obtener más beneficios con el entrenamiento y a tener una mejor recuperación.

Se dice que Sato ha trabajado en esta técnica durante gran parte de su vida, lo que lo llevó a convertirse en una leyenda en el mundo del fitness, e incluso tiene toda una serie de productos, llamados Kaatsu, que se usan para restringir el flujo sanguíneo.

Recientemente, un médico deportivo llamado **Jim Stray-Gunderson** (que fue quien creó el método de "entrenar alto", donde le recomienda a los atletas dormir sobre los 2400 metros sobre el nivel del mar para mejorar su desempeño), que trabaja con las organizaciones olímpicas de Noruega y Estados Unidos, analizó la restricción del flujo sanguíneo y asegura que funciona.

Stray-Gunderson llegó a entrenar con Sato y asegura que el método **hace que un entrenamiento se vuelva mucho más efectivo** sin tanto esfuerzo. "Puedes tener los beneficios de nadar 10.000 metros nadando alrededor de 1000", dijo al Times.

Y no es el único, el entrenador de natación **Chris Morgan** le recomienda la práctica a sus atletas, y Andrew (que compite

Michael Andrew
© Maddie Meyer

en varias pruebas en Tokio) incluso dijo que sus tiempos en la alberca mejoran cuando usa la técnica, y se dice que incluso se le puede ver usando los torniquetes justo antes de salir a sus competencias.

Claro que no todos están de acuerdo en que sea un método que funcione, pero son muchos los entrenadores y atletas que recomiendan esto para sacarle más provecho a un workout, pero también para que el proceso de recuperación, que es esencial para **ganar músculo y fuerza**, sea más efectivo.

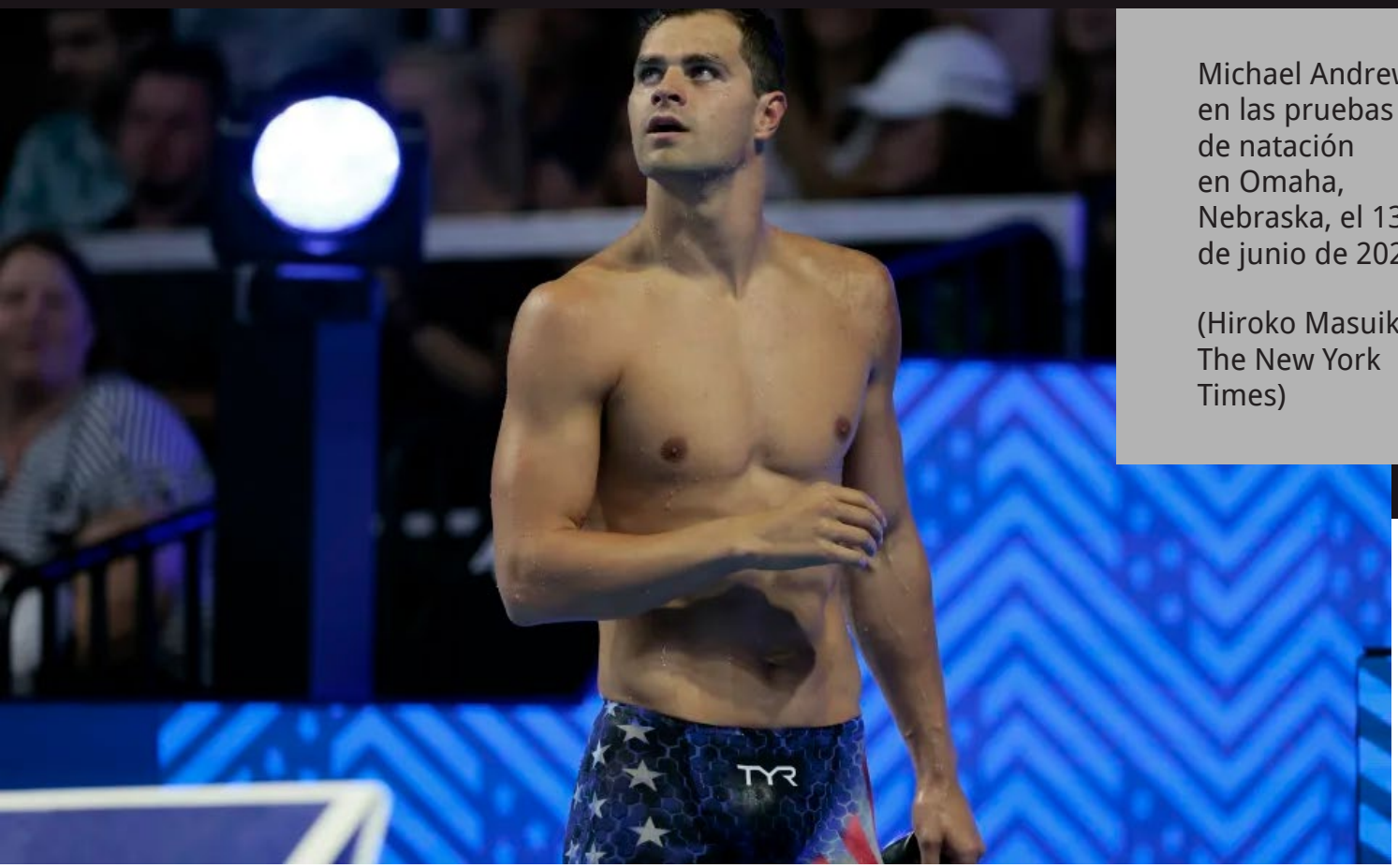
Un artículo del 2000, publicado en **Journal of Applied Psychology**, escrito por un grupo de investigadores japoneses en conjunto con Sato, dice que la restricción de flujo sanguíneo acelera los procesos normales y, de acuerdo con el Times, hay varios investigadores independientes que confirman las ventajas de usar la técnica y que incluso ayuda a que puedas bajar la carga de entrenamiento sin sacrificar los resultados.

Tokio 2020
© Dylan Martinez - Pool

Una tendencia de fitnes en boga entre los olímpicos: la restricción del flujo sanguíneo

yahoo!deportes

By Matthew Futterman



Michael Andrew en las pruebas de natación en Omaha, Nebraska, el 13 de junio de 2021.

(Hiroko Masuike/ The New York Times)

Cada cuatro años, las Olimpiadas le muestran al mundo el método más reciente de entrenamiento o recuperación que han usado los mejores atletas.

En 2016, muchos nadadores tenían marcas de círculos rojos en la piel a causa de la "terapia de ventosas", una antigua práctica china que involucra succión en los músculos y tendones adoloridos.

Este año, parece que lo que está de moda son los torniquetes.

No, no hay un estallido de cortadas. Sin embargo, el nadador estadounidense Michael Andrew usa bandas parecidas a torniquetes en la piscina de práctica. Galen Rupp, el defensor de la medalla de bronce en la maratón, a veces se amarra bandas similares en las piernas durante los entrenamientos.

Ellos son algunos de los atletas de élite que se han vuelto discípulos de una práctica conocida como restricción del flujo sanguíneo, que es exactamente como suena: cortar el flujo de sangre de ciertos músculos durante

periodos limitados para mejorar los efectos del entrenamiento y estimular la recuperación.

La práctica se ha puesto en boga justo a tiempo para los Juegos Olímpicos de Tokio, y muchos piensan que es un reconocimiento al trabajo de Yoshiaki Sato, un exlevantador de pesas japonés que la desarrolló en 1966.

Durante la mayor parte de su vida adulta, Sato, de 73 años, ha perfeccionado y difundido esa técnica con la cual ha creado una pequeña fortuna al convertirse en una versión japonesa de Jack LaLanne. Sato ha creado una práctica y una serie de productos llamados Kaatsu que están orientados a la restricción del flujo sanguíneo. Sato sigue practicando la restricción del flujo sanguíneo todos los días y ahora está maravillado por la atención que está recibiendo.

“Siempre fue cuestión de tiempo”, comentó este mes en una entrevista desde su casa en Fuchu, un suburbio de Tokio. “Pero no pensé que tardaría tanto”.

En años recientes, la restricción del flujo sanguíneo ganó un importante defensor del otro lado del Pacífico con Jim Stray-Gundersen, un médico e investigador especializado en medicina deportiva que ha trabajado de cerca con las organizaciones olímpicas de Estados Unidos y Noruega.

En esencia, Stray-Gundersen creó la estrategia “vive alto, entrena bajo” del entrenamiento en altitudes, según la cual se les receta a los atletas dormir y vivir arriba de 2400 metros sobre el nivel del mar para aumentar la producción de los glóbulos rojos que transportan el oxígeno y luego bajar miles de metros a entrenar para no exigirle demasiado al cuerpo.

A inicios de la década pasada, Stray-Gundersen entrenó con Sato y se le llegó a conocer como el “maestro del Kaatsu” antes de que cada quien tomara su propio camino. Luego, en 2016, Stray-Gundersen creó sus métodos personales de restricción del flujo sanguíneo y una empresa llamada B Strong.

“Puedes tener los beneficios de nadar 10.000 metros nadando alrededor de 1000”, comentó recientemente.

Andrew, una estrella en ascenso de 22 años que nadará en tres eventos individuales y participará en los relevos en Tokio, mencionó que hace cinco años comenzó a experimentar con la restricción del flujo sanguíneo después de que lo instó Chris Morgan, un veterano entrenador de natación.

Andrew a menudo se amarra las bandas en los brazos durante las carreras cortas de 25 metros e intenta lograr los mismos tiempos que cuando no las usa.

“Claro que es muy difícil”, comentó Andrew en una entrevista de este mes. “Pero estás simulando una sensación de dolor verdadero que engaña al cuerpo para que se regenere”.

El nadador entró en una pequeña relación de negocios con la empresa de Sato después de usar sus productos durante años (si un cliente usa el código de Andrew, Kaatsu dona el 20 por ciento de la venta al club de natación de Andrew).

Antes y después de entrenar y competir, Andrew se amarra un dispositivo en lo alto de cada pierna, luego aumenta y disminuye la tensión del torniquete en intervalos regulares —como un esfigmomanómetro— para estimular el flujo sanguíneo y recuperarse. A veces, usa las bandas en la sala donde se preparan los nadadores antes de dirigirse al borde de la piscina para una carrera.

No todo el mundo se ha sumado a la tendencia. Dave Marsh, quien ha entrenado a varios nadadores para las Olimpiadas y está a cargo del equipo de Israel en Tokio, comentó que uno de sus atletas había usado la restricción del flujo sanguíneo para recuperarse y rehabilitarse de

una lesión, pero que todavía no la recomendaría para entrenar.

“La primera labor de un entrenador es no hacer daño”, mencionó Marsh. “Desde mi punto de vista, con la restricción del flujo sanguíneo un atleta podría dar un paso hacia atrás”.

Cuando un colega le contó que la restricción del flujo sanguíneo les estaba ayudando a sus atletas a aumentar en dos semanas la masa muscular que normalmente aumentaban en seis, como cualquier buen científico del deporte, Stray-Gundersen quiso ver los datos. Resultó que había un artículo del año 2000 publicado en Journal of Applied Physiology, cuyos autores eran Sato y unos científicos de institutos de investigación de Japón.

En pocas palabras, según el artículo, la restricción del flujo sanguíneo provocaba una respuesta inmensa desde el cerebro para acelerar el proceso normal de reparación y reconstrucción del tejido dañado.

Cortar el flujo sanguíneo y luego volverlo a encender puede estimular al cerebro para que use más poderes curadores de los que este normalmente pensaría que necesita.

Desde la publicación de ese estudio, varios investigadores independientes han confirmado los beneficios potenciales de la restricción del flujo sanguíneo durante el ejercicio. En la actualidad, Shawn M. Arent, presidente del Departamento de Ciencias del Ejercicio en la Universidad de Carolina del Sur, está realizando un estudio sobre sus efectos para el Departamento de Defensa.

Arent comentó que las primeras tendencias sugerían que la práctica se podía usar de un modo más eficiente cuando los atletas quisieran bajar su carga de entrenamiento sin sacrificar el estado físico, ya fuera mientras se encuentran tranquilos antes de la competencia o, al final de una temporada, mientras se recuperan de una lesión.

“Es un buen suplemento para el entrenamiento; no es todo el entrenamiento”, agregó Arent. “Ofrece un estímulo psicológico cuando otras cosas pueden tener un alcance limitado”.

Para alguien como Andrew, quien nada miles de metros al día; Rupp, cuyo régimen incluye más de 100 kilómetros por semana más entrenamiento de peso y trabajo de abdomen; el lanzador de los Mets de Nueva York Noah Syndergaard; la campeona esquiadora Mikaela Shiffrin o cualquier otro atleta de élite que haya empezado a incorporar la restricción del flujo sanguíneo, la técnica les permite reducir la probabilidad de una lesión repetitiva por esfuerzo y acelerar el tiempo de recuperación.

Para Andrew, la parte más importante de la técnica podría ser la fe ciega que le tiene. Como lo sabe cualquier científico del deporte, los placebos a menudo pueden ser tan fuertes como una droga.

“Nadé algo así como 18 carreras en siete días en las pruebas y me sentí fresco”, mencionó Andrew. “Estoy seguro de que eso sucedió porque fui muy disciplinado con la recuperación. La usé todo el tiempo”.

Entenda por que alguns atletas restringem fluxo sanguíneo para treinar melhor

CNN BRASIL

By Paloma González

Técnica criada pelo japonês Yoshiaki Sato acelera reações bioquímicas para fortalecer e recuperar músculos; interessados devem tomar cuidados antes da prática

Restringir o fluxo sanguíneo parece algo perigoso, mas é exatamente o que alguns **atletas olímpicos** e pacientes de cirurgia e fisioterapia têm feito para fortalecer os músculos e acelerar a recuperação.

As origens dessa prática remontam a 1966, quando – enquanto estava sentado nos calcanhares durante uma cerimônia em um templo japonês – Yoshiaki Sato percebeu que suas panturrilhas estavam formigando e bombando.

Sato se perguntou se seu fluxo sanguíneo limitado era a chave para experimentar essa sensação, disse Steven Munatones, o CEO da Kaatsu, um produto de restrição de fluxo sanguíneo homônimo e empresa de educação.

Galen Rupp, Michael Andrew e Mikaela Shiffrin, atletas que se usam restrição de fluxo sanguíneo em seus treinos Foto: Montagem: CNN; Fotos: Cliff Hawkins e Tom Pennington/Getty Images; Francis Bompard/Agence Zoom/Getty Images

Munatones foi cofundador da Kaatsu Global – que se traduz em "pressão adicional" em inglês – com Sato em 2014, após ser orientado por ele sobre a técnica Kaatsu por 13 anos no Japão.

Sete anos após a sensação inicial de formigamento, Sato "experimentou diferentes tipos de bandas colocadas em diferentes locais de seu corpo – da cabeça ao torso e à parte inferior das pernas", disse Munatones por e-mail. "Em 1973, ele quebrou o tornozelo e se reabilitou usando o Kaatsu."

Esta foi a primeira experiência com o modo de ciclo Kaatsu, que ocorre quando as bandas com "bolsas de ar" internas são infladas por 30 segundos à medida que as bandas se comprimem em torno dos membros superiores e, depois, esvaziam por cinco segundos antes de repetir o ciclo, acrescentou Munatones.

Esta compressão rítmica retarda o fluxo sanguíneo de volta para o coração e, portanto, permite que as veias e capilares nas áreas tratadas se encham de sangue – visível conforme a pele gradualmente fica vermelha – enquanto você se exercita, disse Munatones.

Este ingurgitamento acelera várias reações bioquímicas que ocorrem naturalmente, como a secreção de óxido nítrico, hormônio de crescimento humano, fator de crescimento semelhante à insulina tipo 1 e beta endorfinas, todos os quais têm papéis diferenciais no aumento do suprimento de sangue, prevenção de danos aos tecidos, regulação da composição corporal e crescimento muscular, crescimento de ossos e tecidos e supressão da dor.

"Os indivíduos se exercitam durante a aplicação de Restrição de Fluxo Sanguíneo (BFR, em inglês) para melhorar a massa muscular, força muscular, reduzir a dor, melhorar a recuperação, aumentar a capacidade cardiovascular e aumentar o desempenho esportivo", disse o fisioterapeuta Nicholas Rolnick, por e-mail.

Desde a descoberta de Sato e estudos subsequentes em milhares de pessoas, atletas, entusiastas fitness e atletas olímpicos – incluindo o corredor de longa distância Galen Rupp, a mergulhadora Laura Wilkinson, o nadador Michael Andrew e a esquiadora alpina Mikaela Shiffrin – se beneficiaram com a técnica.

Mas você não precisa ser um atleta para usar Kaatsu ou restrição de fluxo sanguíneo.

Aqui está o que os especialistas dizem que você deve saber antes de tentar a técnica:

Como funciona

Quando alguém se exercita enquanto pratica Kaatsu ou restrição do fluxo sanguíneo, o sangue e os subprodutos metabólicos ficam "presos no músculo, incapazes de sair", disse Rolnick.

"Os metabólitos aumentam a fadiga muscular, fazendo com que o músculo trabalhe muito mais do que normalmente produziria uma contração com cargas leves", acrescentou. "Temos que trabalhar muito para acompanhar o exercício e esse esforço extra, combinado com a fadiga produzida pelo BFR, acelera a massa muscular e o ganho de força."

As fibras musculares necessárias para realizar

ações de alta intensidade – como pular, arremessar, levantar pesos ou chutar – são recrutadas em intensidades mais baixas do que o normal, disse Stephen Patterson, professor de fisiologia do exercício aplicado e desempenho na St Mary's University, em Londres, via e-mail.

Isso significa que alguém pode levantar de 20% a 30% de seu peso máximo, em vez dos habituais 70% ou mais, e ainda assim ter uma resposta como a de treinar com cargas mais pesadas, acrescentou.

Cuidados antes de tentar o BFR

As pessoas para as quais esses especialistas venderam produtos relacionados, trataram ou estudaram incluem atletas de quase todos os níveis de habilidade, pessoas que levam estilos de vida sedentários e aqueles que se recuperam de lesões e variam de 18 a 104 anos.

A capacidade de usar cargas muito mais baixas durante o treinamento de restrição do fluxo sanguíneo para construir músculos e aumentar a força "é especialmente benéfica para aqueles que estão feridos ou têm outras condições que não os permitem levantar grande quantidade de peso ou realizar exercícios aeróbicos de alta intensidade", disse Patterson.

Isso inclui pessoas que fizeram uma cirurgia recentemente ou são paraplégicas ou tetraplégicas.

"Os principais problemas no ambiente de reabilitação são a incapacidade dos pacientes de treinarem de forma eficaz devido a uma lesão ou precauções pós-cirúrgicas, bem como dor", disse Rolnick. "O crescimento do treinamento BFR permite aos indivíduos que seriam incapazes de desafiar seus corpos em circunstâncias normais a chance de construir mais força e massa muscular em momentos em que seria quase impossível."

Se você acabou de fazer uma cirurgia e tem grandes incisões com pontos e deseja praticar o Kaatsu imediatamente, converse com seu médico primeiro, disse Munatones. "A razão é porque a incisão cicatriza muito, muito mais rápido do que o normal e sua pele pode crescer muito rapidamente sobre os pontos – o que geralmente surpreende os cirurgiões ortopédicos com a rapidez com que o corpo se recupera com o uso de Kaatsu."

Os grupos para os quais a restrição do fluxo sanguíneo pode não ser apropriada incluem pessoas com hipertensão, diabetes não controlada, obesidade, doença renal, calcificação arterial, histórico de coágulos sanguíneos e medicamentos ou condições que causam maior risco de coagulação, tromboembolismo venoso, doenças vasculares, anemia falciforme, câncer, sistemas circulatórios deficientes ou fratura exposta, disseram esses especialistas.

Os potenciais efeitos colaterais incluem tontura, pequenas manchas vermelhas nos braços, hematomas perto do equipamento, sensação de ser espetado por alfinetes e agulhas e danos aos nervos, alguns dos quais podem ser evitados praticando adequadamente a restrição do fluxo sanguíneo.

Fale com seu médico antes de tentar este tipo de treino ou se sentir estes ou outros efeitos colaterais negativos.

Como praticar a técnica

Com relação aos equipamentos, Patterson recomendou o uso de produtos de classe médica que fornecerão uma leitura para garantir que as pressões anunciadas sejam verdadeiras.

"Bandas de exercícios e outros materiais podem restringir o fluxo sanguíneo, mas de uma perspectiva de segurança, não há ideia do nível de restrição que você está aplicando", escreveu ele por e-mail. Isso pode limitar as adaptações e respostas ou causar lesões.

"Existem muitas braçadeiras no mercado, mas minha recomendação mínima é uma braçadeira pneumática que pode ser inflada automática ou manualmente (como uma braçadeira de pressão arterial)", disse Rolnick.

"Cada um desses tipos de braçadeiras pode medir cuidadosamente a quantidade de sangue restringida para aumentar o perfil de segurança. Isso é muito importante porque conforme o BFR continua a crescer, mais braçadeiras vão entrar no mercado e podem não ser adequadas ou apropriadas."

Rolnick e Patterson aconselharam qualquer pessoa que queira começar com restrição de fluxo sanguíneo a trabalhar e treinar com médicos de confiança para determinar quais braçadeiras seriam consistentes com seus objetivos – e para entender como e quando usar esse tipo de treinamento.

Caso contrário, acrescentou Rolnick, você corre um risco maior de ter um resultado negativo – especialmente porque uma braçadeira de exercício comum não pode medir a quantidade de pressão que você está aplicando.

Você pode esperar sensações de queimação ou dor durante ou após as primeiras sessões, mas geralmente diminuem na terceira sessão, disse Hunter Bennett, professor de ciência do exercício na University of South Australia, por e-mail.

Depois de inflar a braçadeira, você pode praticar a restrição do fluxo sanguíneo alternando repetições e descanso enquanto treina seu grupo muscular preferido, disse Bennett.

O consenso entre esses especialistas é que o uso da restrição do fluxo sanguíneo duas a quatro vezes por semana é necessário para que os resultados ocorram.

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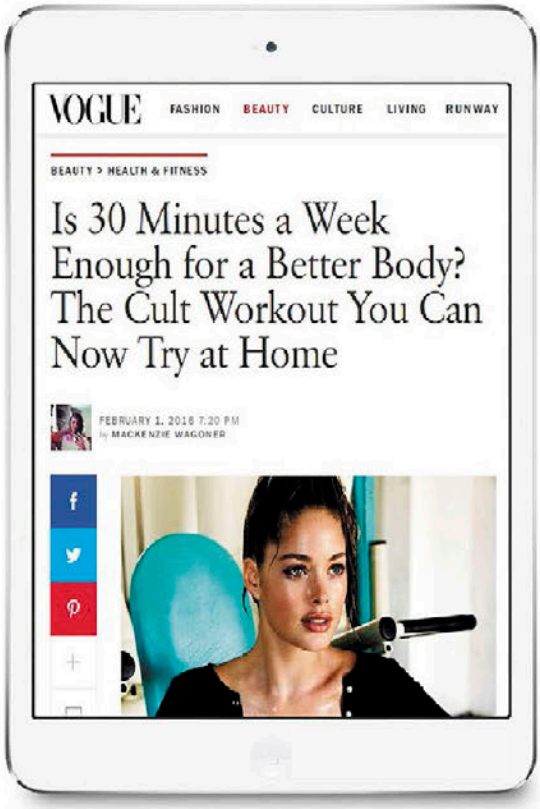

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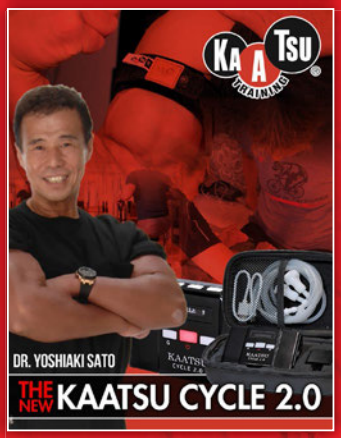

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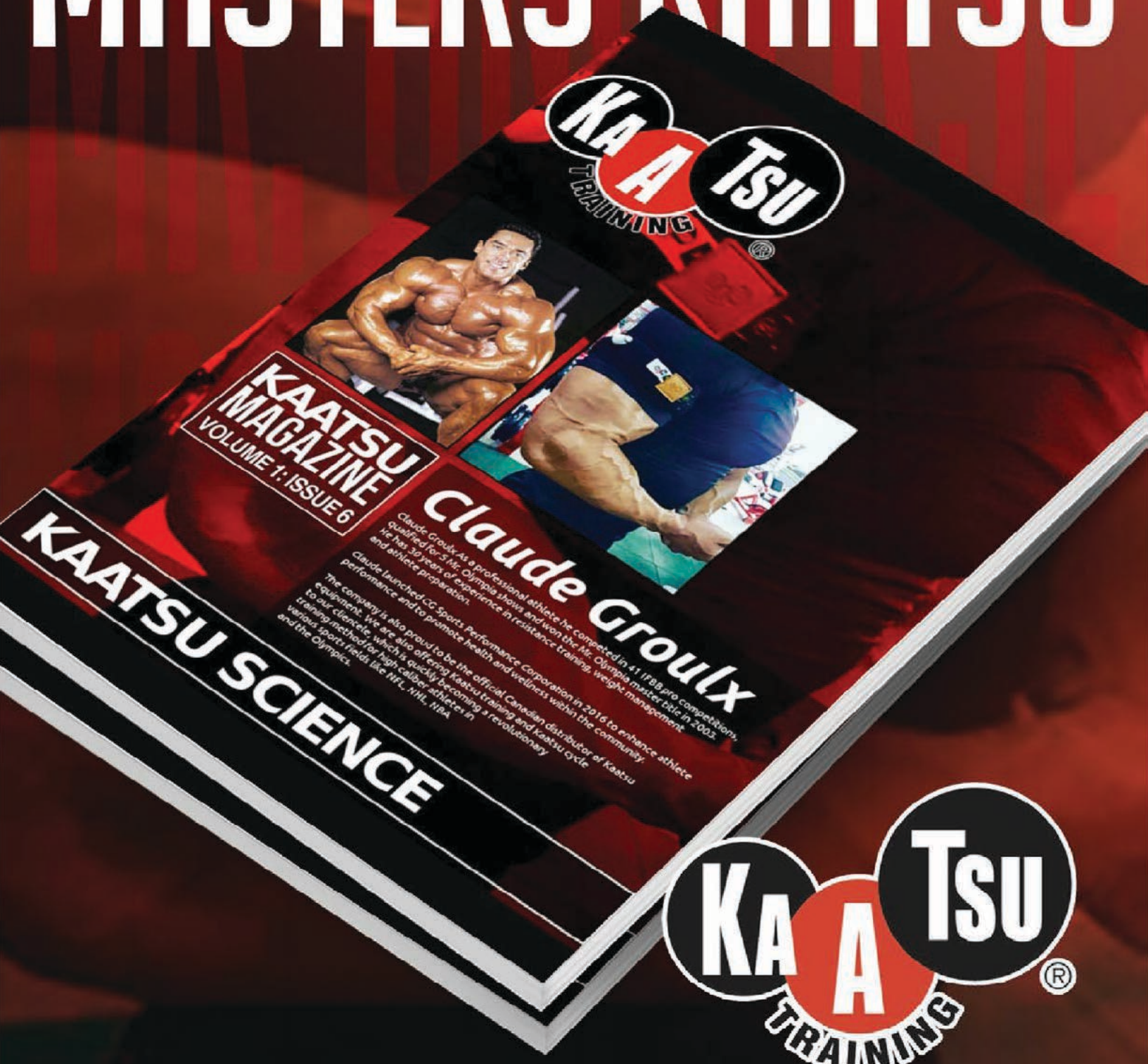

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