Claude Groulx

As a professional athlete he competed in 41 IFBB pro competitions, qualified for 5 Mr. Olympia shows and won the Mr. Olympia master title in 2003. He has 30 years of experience in resistance training, weight management and athlete preparation.

Claude launched CG Sports Performance Corporation in 2016 to enhance athlete performance and to promote health and wellness within the community.

The company is also proud to be the official Canadian distributor of Kaatsu equipment. We are also offering Kaatsu training and Kaatsu cycle to our clientele, which is quickly becoming a revolutionary training method for high caliber athletes in various sports fields like NFL, NHL, NBA and the Olympics.
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Claude Groulx, the 2003 Mr. Masters Olympia and former professional bodybuilder from Montreal, Canada, was in a hotel in Tokyo. He had traveled to Japan to meet Dr. Yoshiaki Sato, the KAATSU inventor. He was full of energy and excitement to learn more about KAATSU and Dr. Sato had agreed to share all his knowledge and expertise with Claude for two days of intense KAATSU education.

Over the course of that 48 hours, Dr. Sato discussed HGH, nitric oxide, IGF-1, VEGF (vascular endothelial growth factor), mTOR, CRP (C-reactive protein) and stem cells with Claude in a fascinating, non-stop discussion and demonstration of all kinds of applications and protocols of KAATSU.

Towards the end of one session, Dr. Sato asked Claude if he would like to do bench press set with KAATSU Air Bands on. Claude mentioned that he was nursing an injury and declined the opportunity.

But Dr. Sato showed him how he could max out with 3 sets of bench press even though he was injured. Claude finished his exercise with the broadest smile possible. He was humbled how KAATSU Cycle and Dr. Sato’s protocols could be utilized by a professional bodybuilder with an injury.

With the goal of sharing Dr. Sato’s KAATSU invention and know-how with the world, the employees of KAATSU Global and KAATSU Specialists like Claude enjoy teaching KAATSU protocols to people of all ages, abilities and backgrounds. This digital magazine is one means of sharing this information and various stories and experiences of KAATSU users with many others in the 32 countries where KAATSU is currently distributed. Thank you very much for your interest and support.

Steven Munatones
Steven Munatones, CEO & Co-founder
KAATSU Global, Inc.
Huntington Beach, California, U.S.A.
Dr. James Stray-Gundersen of the United States Ski & Snowboard Association explains the local and systemic mechanisms of KAATSU Training that is used by elite professional and Olympics athletes and non-athletes alike.
The initial results were published in the Chinese language in the Chinese Journal of Laboratory Diagnosis (25 Aug 2016 issue, Vol. 20, No. 8, P. 1240) entitled Effects of KAATSU Training on proliferation and differentiation of goat bone marrow mesenchymal stem cells by Yu-hui Yang, Shao-qian Sun, Yoshiaki Sato, et al.

The English translation of the paper is below:

**OBJECTIVE**

To explore the effects of KAATSU Training on proliferation and differentiation of goat bone marrow mesenchymal stem cells.

**METHODS**

60 Boer goats were randomly divided into experimental group and control group, the experimental group was given KAATSU Training twice a week, non-KAATSU Training twice a week for the control group. 6 months later, we got the goat bone marrow and then separated and
absorbed the white cloud layer which mainly contained the mononuclear cell in the upper-middle interface with the method of percoll-density gradient centrifugation, cultured and observed the cell morphology and the proliferation rate; the cells of the two groups were induced into cardiomyocyte like cells by the 5-azacytidine. The cells which had been differentiated were detected with the expression of the cardiac specific antigen α-actin by immunofluorescence assay.

**RESULTS**
The cells isolated from the bone marrow in the white cloud layer were adherent, generated and grew well. In addition, the cells which induced by 5-azacytidine could express the cardiac specific antigen. The bone marrow mesenchymal stem cells of the experimental group were small and round, and their proliferation rate was faster than the control group, though the shape of the cells in the control group were polygonal or triangular, and the proliferation rate were slow.

**CONCLUSION**
It has been succeeded both in separation and cultivation of the bone marrow mesenchymal stem cells, and also induced the proliferation of turning into cardiomyocyte like cells in vitro. The bone marrow mesenchymal stem cells in pressurization motion for a long period of time were easier to proliferate than the cells in non-pressurization motion, but the differentiated capability were low.

Bone marrow mesenchymal stem cells (BMSCs) are from the mesoderm and are pluripotent stem cells with high capability in proliferation, self-renewal and multi-directional differentiation potential. Further studies have demonstrated that BMSCs can differentiate into cardiomyocytes, neurons or neuroglial cells. Upon in vivo transplantation, these cells can migrate to injured sites (mostly to ischemic or anaerobic sites) and repair respective tissues. Cell transplantation has provided brand-new treatment strategy to irreversible heart diseases. BMSCs are currently considered as one of the most ideal seed cells for cell transplantation, and are often used as carrier cells in gene therapy. Allogeneic BMSC transplantation may trigger immunologic rejection, while autologous stem cells are of limited quantities.

It is therefore crucial to look into how autologous stem cells could proliferate and be release to the bloodstream, especially in large mammals. In recent years, the number of studies focused on small animals such as mice/rat or rabbit is relatively high, but few studies and report investigate into BMSCs in bigger animals like goats. Thus, it is important to study the in vitro directed differentiation of BMSCs from goat as a big animal.
KAATSU Enhances mTOR Signaling Pathways

The January 2016 issue of Heart and Vessel Journal, published by Springer, includes an article by Japanese researchers Toshiaki Nakajima, Tomohiro Yasuda, Seiichiro Koide, Tatsuya Yamasoba, Syotaro Obi, Shigeru Toyoda, Yoshiaki Sato, Teruo Inoue, and Yutaka Kano that is entitled Repetitive restriction of muscle blood flow enhances mTOR signaling pathways in a rat model.

The final publication of this article is available here at link. springer.com (ISSN 0910-8327, Heart and Vessels, DOI 10.1007/s00380-016-0801.6).

The researchers are from the Dokkyo Medical University and Heart Center, Seirei Christopher University, University of Electro-Communications, and University of Tokyo in Japan, and KAATSU International University in Sri Lanka.
Carl Lanore of Super Human Radio interviewed Dr. James Stray-Gundersen about KAATSU on October 12th 2015.

...it's Super Human Radio with your host, Carl Lanore.

Carl Lanore: Hey, hey welcome back to another episode of Super Human Radio. We have a great show planned for you today. We’re going to be covering quite a few really important subjects. We’re going to be joined by Dr. Jim Stray-Gundersen to talk about KAATSU training. There's a lot of discussion about KAATSU, a lot of misinformation out there.

There isn’t a single person on the planet that knows more about it, even above and beyond the Japanese scientist that discovered it than Dr. Jim Stray-Gundersen, so we'll have some good questions and answers for him.

We started talking about KAATSU training in early 2006 I did my first discussion with a Japanese scientist and ever since then it has really intrigued me and everybody else out there. We’re going to get to the bottom of KAATSU training today with Dr. James Stray-Gundersen. How you doing Dr. Gundersen?
Dr. Stray-Gundersen: Very good, thanks Carl.

Carl Lanore: Let me just give a brief highlight of your CV here because it's very impressive.

Dr. Stray-Gundersen: [chuckles] Sure.

Carl Lanore: Well you're a general surgeon, which qualifies by the way to run for president now.

Dr. Stray-Gundersen: [laughs]

Carl Lanore: University of Southwestern Medical School, Associate Professor in Exercise Science and Human Performance for the past 18 years; four Olympic games as physician or physiologist; twenty world championships at various sports physician, physiologist; altitude expert. We were just talking about the role of hypoxia and remodeling of fat cells in leptin sensitivity. World renowned anti-doping expert and involved in many sports to advance performance legally and ethically, NFL, ABA, FIFA, I mean your list goes on-and-on.

Why did you look at – what made you interested in KAATSU training first of all?

Dr. Stray-Gundersen: Well it kind of goes back aways. As you pointed out my initial education was as a general surgeon, but after I finished my general surgery residency I ended up doing some post-doctorate fellowships in cardiovascular physiology and another one in human nutrition. I kind of or I did fall in love with the idea of using the medicines of exercise and nutrition to promote health and fitness. And that wasn't really aligned with taking out gallbladders. So I ended up having a career as you pointed out in academic medicine and doing various research projects. But the key thing to all of these things is looking forward to how to optimize human health and fitness.

About four years ago I got introduced to KAATSU. It just struck me as one of those things that is a real paradigm shifter in terms of how we can safely and effectively improve health and fitness in humans.
Carl Lanore: So KAATSU was first written about in a paper from some Japanese scientists who were looking at KAATSU. Correct me if I’m wrong because it's been awhile, but they were looking at KAATSU not necessarily for performance, but as a therapeutic aid to recovering from an injury and avoiding the muscle loss generally seen from an injured limb, right?

Dr. Stray-Gundersen: Right. Right here is the essence of KAATSU. So basically what we do is with very light weights that can be done by anybody whether they have an injury or not, we end up being able to do maximal strength training exercise. So that exercise then mitigates any atrophy that might be happening, but it also sets up a kind of hormonal situation where you end up adapting to the exercises that you’ve done, but you've tricked the brain. Normally to get this kind of hormonal release you have to be lifting really heavy loads and exhausting yourself and with KAATSU you can do it with very light loads and in a short period of time. So it ends up being a very efficient way of doing this. Then there's applications for whether it’s seniors who can’t lift very heavy weights in the first place or someone who’s injured, say someone who’s torn their ACL and they’re coming back from an ACL tear, but this is a way to exercise their quads to get that muscle mass back.

Carl Lanore: So and you know I’ve often thought what I’m about to say but I’ve never said it on the show, there’s always this discussion about what builds bigger muscles?

Dr. Stray-Gundersen: Yeah.

Carl Lanore: And there's the group out there that says you know heavier loads and the group that says higher reps and the reality is that it can be either if you stimulate a phenomenon which I can only use the word "muscular congestion." Depending on when you were able – where in that dynamic of exercise that your performing whether it’s heavy weight or higher reps, you know lower reps with heavy weights or higher reps with lighter weight, if the muscles getting congested that is where it appears that the intramuscular growth factors and switches that seem to be exploited by KAATSU really say, "Look this is what builds muscle. It doesn't matter if you're using heavy weight with low reps, it doesn't matter if you're using light weight with high reps, what matters is that this condition is occurring in the muscle." Am I off base on that?

Dr. Stray-Gundersen: No. I would just kind of phrase it a little differently. I would say that what KAATSU does is it impedes the blood flow out of the muscle such that the muscle when it’s exercising it can’t get its normal recovery that blood flow allows. And because it can't recover a profound disturbance of homeostasis is induced in this muscle. This disturbance of homeostasis and I know that’s a little bit of a mouthful, but this disturbance of homeostasis is when for example the oxygen levels in the muscles go down or the pH does down, which means that the environment is becoming more acidic or various electrolyte gradients are coming out of spec if you will and there is a variety of these things that happen when a muscle is exercising and it can't get recovered.

This contraction becomes unsustainable and then that unsustainable contraction sends a signal up into the brain saying, “Holy mackerel guys you got to help me out here.” We're aware of that feeling cortically by a hard effort or a feelings of fatigue or feelings of congestion and a variety of these things such that we end up sending the brain this signal. It’s usually only in both cases like you know 20-miles out on a long run or by lifting 300-pounds squats and doing that kind of thing where you'd get to these situations where the disturbance of the homeostasis in the muscle has been so profound that these kind of messages to the brain are screaming out for help.

Then the brain responds by an outpouring of a hormonal milieu that maybe milieu that may be best illustrated by increases in growth hormone or profound increases in growth hormone from this exercise. Then that healing anabolic hormonal response out of the brain is then responsible for all this rebuilding process and healing process and then we go from there. Under normal circumstances whether it's with the marathon or whether it's Olympic weightlifting that muscle has been damaged by this stuff. But in the case of KAATSU we haven't damaged the muscle, we've just fooled the brain into thinking all hell was breaking lose.

Carl Lanore: Aaaaah interesting.

Dr. Stray-Gundersen: Okay? And so then you adapt – instead of having to dig yourself out of this hole you just can start increasing strength and fitness right off the bat.

Carl Lanore: Oh man okay so two things that jump out of me big time here that I did not understand and this is really great stuff. You’re right because we talk about the net synthetic response of exercise in building muscle and we know that if damage is negative 10 and growth is positive 12, you have a net influence of 2 on the growth of muscle. What you’re saying is damage is zero, so whatever the growth impetus is that is a positive X whatever that is.

Dr. Stray-Gundersen: Right.

Carl Lanore: So you're really building on a foundation of already ready to grow muscle as opposed to previously damaged muscle.

Dr. Stray-Gundersen: Exactly. So we've altered the balance. We've really decreased those negative stimuli to a minimum and we've maximized because this is a maximal signal, we've maximized adaption healing response. And so you know you just tilted the teeter-totter and all of a sudden you know off you go getting stronger and fitter right off the bat and you've done it with really low weights.

Carl Lanore: Okay.

Dr. Stray-Gundersen: So anybody can do it.
Carl Lanore: Okay now wait a minute because we're going to get into the weight loads in a second. Now the other misunderstanding I've been under is that the increase in growth factors, mechano growth factor which I think is IGF1 or IGF or something like that, all these things happen in the muscle exclusively than systemically. Am I incorrect? Is it just being what's the word I'm looking for, trapped and concentrated in the muscle, but it's actually produced systemically?

Dr. Stray-Gundersen: Well there's a couple of things, there's both local effects and systemic effects.

Carl Lanore: Okay.

Dr. Stray-Gundersen: So imagine we have a muscle exercising and its blood flow is not a happy camper, it can't recover the muscle as well as it would like too. So then there are various sort of near-term hormones that are in the tissue itself or in the surrounding tissue that end up sending signals that do a variety of things. Like they essentially try to repair this damage that's being done. There's various cytokines that are locally released that do things like turn on protein metabolism, they prepare cell-surface receptors such that they will be responsive to any systemic hormones that are coming along. Those sorts of things are all done at a local level.

Then because this signal of this disturbance of homeostasis has been sent up into the brain it has caused among other things the pituitary to release a lot of growth hormone. This growth hormone then goes among other places to the liver where it stimulates the production of IGF-1. Then IGF-1 then goes out throughout the whole the whole circulation. It then where there are cell receptors that have been up-regulated or turned-on such that they will be receptive to these anabolic stimuli, then those tissues that have been exercised end up further amplifying their production of proteins and trying to repair what damage was done. The nice little thing about this is that the damage wasn't done, we just fooled the brain into thinking it was.

Carl Lanore: This is brilliant. Then obviously the brain gets – the body gets to work in super compensating and preparing for the possibility of another one of these muscular onslaughts and it increases the muscle size and we're going to talk about obviously it influences hypertrophy, but we're going to talk about strength in a second.

Carl Lanore: You know everybody talked about work smarter not harder. Lee Haney used to say, "Stimulate, don't annihilate."

Dr. Stray-Gundersen: There you go.

Carl Lanore: It sounds to me like KAATSU is the gold standard for those who want to work smarter not harder. But let's talk about two things when we come out of the break. Let's talk about the load, because what I see people doing with KAATSU is instead of using a light weight they use heavier and heavier weights and try to bridge the strength and muscle hypertrophy gap.

Dr. Stray-Gundersen: Yeah, don't need too. [chuckles]

Carl Lanore: But also I want to talk about what KAATSU is not good for, if there is anything and then we will talk more about training styles.

In the meantime if you're anxious to get information you can go to the website KAATSU-global.com. I'm going to spell it for you, it's: K-A-A-T-S-U hyphen or dash depending on what part of the country you're from, global.com. They're giving away a free four megabyte report on lots of the things that we're talking about here. You need to go there and get that.

We talk about advanced training techniques like statics and negatives. There may not be anything more advanced than KAATSU, but you have to understand how to use it, because like all things that really work it can backfire on you too and we'll talk about that in the show too.

We're talking about KAATSU training right now with Dr. James Stray-Gundersen. I have to thank a listener from Budapest, Hungary for putting this show together today and that's Peter Lakatos.

A lot of the things that we're talking about here today if you want to get a little deeper into it you can go to the website, KAATSU-global: K-A-A-T-S-U hyphen G-L-O-B-A-L.com and download their report and obviously communicate with them there if you want to try to adapt this to your own training.

So first things first the weights that people use must it be light weight or is there an advantage to doing some sort of progressive loading when you're doing KAATSU?

Dr. Stray-Gundersen: Yeah Carl this is really an important point. We're paradigm shifting here. We're thinking about using impeded blood flow or modified blood flow plus low weights, light weights, easy weights to send this signal to the brain. So we're using the muscles that are you know normally when we think about training we think about we're training the muscles that we're exercising. This is we're using the muscles that are being exercised in contute to send this signal that causes the whole body to adapt.

So one of the things about in terms of the loads we absolutely don't want to use heavy loads because that ends-up becoming a combination of modifying the blood flow and using heavy weights can produce damage to the muscle fibers. So we always want to stay on the side where we're doing really light weights like you know two-pounds arm curls or we can do things with partial body weight like push-ups or –
Carl Lanore: Yeah I was just going to say that. It sounds to me like if you want to do KAATSU look a lot of us going to the gym with our training buddy, his name is Ego and the last thing we want to do is grab a pair of two-pound dumbbells and have 19-inch arms and people go, "What's that about?"

You know when I was a kid there were guys in the neighborhood that would buy a Camaro, put a Phase 3 hood on it, put Mickey Thompson 50-Series tires on the back, put you know traction bars on it and they had a four cylinder or a six cylinder and we used to call that a "pig."

Dr. Stray-Gundersen: [laughs]

Carl Lanore: So you know a lot of us guys we have an ego, we're going to go in and lift heavy. It sounds to me that KAATSU would best suited for bodyweight training.

Dr. Stray-Gundersen: Yes it is. So you can do all the KAATSU exercises and you can get a really good KAATSU effect without any additional weights or devices or anything. Now that's not to say that we're going to have to throw out all the weight racks we have at home. The idea is that particularly for strength-oriented sports, let's say alpine skiing or Olympic lifting or football or these sorts of things where strength is critical and let's say standard weight training has always been part and parcel of getting fit for those sports.

What we do or what we recommend at the U.S. Ski Team where I'm working is that we have the athletes do 90% of their normal weight workout. So to induce a little fatigue but they save the riskier lifts to trying for KAATSU. So we don't want anybody doing maximal squats or these bench presses where they might drop the weight, where they might hurt their back or that kind of thing, but we do all the other stuff.

Then after that workout then they come in and they do a KAATSU session. That really polishes it off, because now the muscles are already fatigued, it's already giving them a little bit of a signal and then we hammer it with this KAATSU program that really takes it over the edge, but does so safely. There's no heavy weights involved. We're able to get people where they just can't do one more pushup. So then what we're doing is we're getting the traditional training plus we're getting what I think of as frosting on the cake by doing that KAATSU session.

Carl Lanore: Okay so the traditional training is going to influence neuromuscular adaptation which gives us strength and instead of doing some you know other type of 20-rep scheme thing just do a KAATSU movement at the end to kind of influence hypertrophy.

Dr. Stray-Gundersen: Yeah. One of the things to think about is you know in various forms of training whether it's strength training or endurance training or all of these things you know there's not that many times in a week where you can really take it to max.

Carl Lanore: Right.

Dr. Stray-Gundersen: And what KAATSU does is again frosting on the cake of all of the other training that's been going on and you just back-off that training just a little bit and you let the KAATSU session end up being those maximal workouts. And because you're not getting the damage that's normally associated with it then for one thing you recover a lot quicker and you're ready to go the next day. You can actually add on more maximal sessions a week than you otherwise could.

All this stuff going back to that initial thing you were talking about where we're shifting the balance between the negative effects of training and the positive effects of training. And so what we're doing is we're cutting down on the negative effects, adding onto the positive effects, getting a more robust adaptation and fitter and stronger and faster and everything.

Carl Lanore: I want to talk a little bit about the way that you occlude and how critical this is. I know the original studies they were using blood pressure cuffs so they could actually measure in milligrams of mercury just how much pressure was being applied.

Today guys go into gym and literally tie ropes around their upper arms that have no give whatsoever and are choking the muscle up. There's a big difference between doing this right and doing this wrong. Can we talk about that when we come back from the break?

Dr. Stray-Gundersen: Absolutely. Carl Lanore: We're talking with Dr. James Stray-Gundersen. We're talking about KAATSU training. This is the definitive interview on KAATSU training because there's lot of misinformation out there.

Dr. Stray-Gundersen: Absolutely.

Carl Lanore: Yeah there is and it's not one of those things that if you get bad information you just won't grow, you can actually hurt yourself. One of the things that people need to be careful about is the level of occlusion or restriction and there's differences in that terminology in the science. Then what they consider vascular occlusion and vascular restriction are vastly different. One seems to still have some compensatory blood flow in-and-out of the muscle. The other seems to stop it completely. How do people determine how far to go or is that something that you offer at the website? Do you offer the actual cuffs and how to use them?

Dr. Stray-Gundersen: Yeah Carl these are great questions. Let me take a moment and kind of describe some of the history here. Dr. Sato really invented KAATSU training in 1966 or that was when he had a little epiphany about how to do this. He then took about 30 years of tying bicycle tires around his arms, judo belts, what have you and kind of learned the hard way and from experience how to do this stuff right.
At the same time kind of little bits of these secrets were leaking out of Japan and into primarily the bodybuilding world and a number of other things. While Dr. Sato really didn't explain himself well a lot of these other people saw what he was doing or at least at the time. Then they had big ideas about what they thought he was doing and went and tried a bunch of stuff for themselves.

So if you think of this area of blood flow restriction as one big thing around the world and there's our whole variety of things that kind of come into that circle, KAATSU is a subset of that. It's really only safe and only really effective when it's done the way Dr. Sato says. So there's a variety of protocols that are very important in terms of how you get these things done right and done safely.

So for example that is the primary reason why we have basically these instruments that allow us to very carefully judge what the right amount of impediment of blood flow is or the right amount of modification.

There's another aspect to this. So the way that we use these bands or the stuff that goes around the arms and the legs is that there's an air bladder in there and this air bladder we can very finely change what the pressure is in there. And what we do then is we kind of go through a set of pressures where we then check to see whether we're seeing the right kind of physical signs that we have not occluded, but that we have impeded blood flow such that the exercises that will be done will produce problems or not problems but failure, fatigue, send a signal up into the brain.

“Look if you’re starting to fail and feel these things in the first couple reps you’re too tight. You’re shooting for a 10 to 15 rep where you start to experience this.”

Carl Lanore: Okay.

Dr. Stray-Gundersen: So it’s very critical the two big things and this is one of the things that the KAATSU protocols are very good for is that we absolutely don't want to occlude. If we do occlude that's the thing that can lead to severe muscle damage or sometimes blood clots or a variety of other complications. Usually pretty much everywhere where we've seen these kind of complications it's because people are either not even doing KAATSU at all or they're doing it incorrectly. So what is critical is getting the right equipment, getting the right education, and then doing this and applying it in the right way.

Carl Lanore: Now there are people out there who are going to try it obviously and they're not going to want to buy things to try it.

Dr. Stray-Gundersen: Right. Carl Lanore: Is there kind of a rule of thumb that look if the muscle is occluded and you're going to feel this severe pump, you're going to feel this accumulation of lactate build up rather quickly, is it kind of like something that we say, "Look if you're starting to fail and feel these things in the first couple reps you're too tight. You're shooting for a 10 to 15 rep where you start to experience this." Is there anything that we can give some safe advice on that or is it something that they must follow exactly what you offer at the website?

Dr. Stray-Gundersen: Yeah it's very difficult –

Carl Lanore: I know you're probably reluctant, I know you're reluctant to give that kind of broad scope statement being within the medical but you know.

Dr. Stray-Gundersen: No, no I think I can address it to some extent. What I would say is that it's not easy to get to the right level of blood flow modification without using the devices.

Carl Lanore: Yeah.

Dr. Stray-Gundersen: So what happens and believe me Dr. Sato has tried over the years to do this in a way where it's just a matter of throwing on some belts and he's come to the conclusion that you need to have this education and you need to have the equipment to make it work right.

Carl Lanore: Right.
sets with very light weights or something like pushups or just getting up and out of a chair.

Carl Lanore: Okay, okay. Now are there any muscles that are not good candidates because of where they are, because of kinesiology, because of where the blood flow comes from, that are not good candidates for KAATSU?

Dr. Stray-Gundersen: Well this is one of the unique things about KAATSU. So one of the things it is a critical step so you know if there is one thing to say never occlude. The next thing to say is always put the bands in the correct places, which is kind of just below the deltoid and just above the biceps and the arms and pretty much high up on the legs as far as you can go. That then produces this impediment of blood flow for all of the muscles that are distal to these bands.

So when that happens then were using as many muscles as possible to get that signal up into the brain to produce that systemic effect. However, all muscles that are getting exercise those muscles their cell-service receptors get turned on and everything else and so they're receptive to this systemic hormonal anabolic response that's coming down the line. So what happens is we make a point of we want to exercise the muscles so that we get that fatigue signal that had their blood flow impeded, but we also want to exercise other muscles that are involved in any of these exercises.

So for example like if we want to get glutes firing their blood flow is just perfectly fine, but the hamstrings and the quads they're blood flow is impeded. So we want to setup a situation where we're getting exercise in all these muscles and even though the glutes don't have their blood flow impeded they're still getting the benefit. Same with also –

Carl Lanore: But wait a minute, but wait a minute, but technically they do and just stay with me because I'm obviously not up on this, but when I used to use some form of KAATSU for my upper arms what I also found was that while the blood flow is being restricted in my biceps and triceps predominately and obviously the forearms because they're downstream.

Dr. Stray-Gundersen: Right.

Carl Lanore: But the muscles upstream are also experiencing some form of occlusion in the way that the blood that normally passes through them is kind of being trapped backed-up. It's kind of like look when you clog a drain nothing on either side of the clog works very well, so my pecs used to get a really good pump and my shoulders used to get a really good pump when I was focusing on my biceps and triceps.

Dr. Stray-Gundersen: Yeah. You're absolutely right, your pecs and your deltoids and your shoulder muscles are all getting a really good influence, but their blood flow is just fine thank you very much.

Carl Lanore: Okay.

Dr. Stray-Gundersen: And so here's one of the things. So let's say that we're going to do a bench press or let's say we're going to try to do a pushup. Let's say it's a pushup, you're using your forearm muscles, you're using your biceps, mainly you're using your triceps, but you're also using your pecs. So the pecs their blood flows happy camper, but the triceps they're the weak spot because they're blood flow impeded and they're starting to fail and they're sending a signal to the brain saying, "Hey guys I'm failing. I need to have a better percentage of my maximal ability to go forward." And the brain then says, "Okay well we got to really whip that horse and get those pushups going so we'll send out a signal to all of the muscles involved in the activity to work harder." And so those pecs are getting the same kind of whip if you will that the triceps and even though they don't really need it. So then you end up getting this exercise benefit for the pecs as well as the triceps and everything else.

Carl Lanore: So the reality is in order to achieve the proper what's the word I'm looking for, not occlusion but, ah, um, isn't this funny I just forgot my own – I got lost. But the bottom line is that in order to get the proper affects from this you really to just be able to get high up on the thighs where they attach into the groin area and between the tri and the upper arms below the shoulder muscles, that's it, that's everything. So you don't have to worry about occluding pectoral muscles or anything else.

Dr. Stray-Gundersen: Right. So point number one, get the bands in the right place. Point number two, modify the pressure and do little tests so that you have the proper amount of blood flow impediment and never occlude. Then point number three is use simple, easy weights, simple movements to get those muscles to fatigue and send that signal up into the brain that then releases the hormonal response.

Carl Lanore: Okay.

Dr. Stray-Gundersen: And it's really that safe and that simple if you do it that way and you know so you know there's tons of people that think that one's good, ten is better, well all that stuff is not the way to do KAATSU.

Carl Lanore: Okay. So now we're going to take a commercial break and I have some questions I've always wanted to ask about certain supplements and their influence on the results of KAATSU and hopefully you'll have some opinions and perspectives on this.

We're talking right now with Dr. James Stray-Gundersen and the website is KAATSU-global: K-A-A-T-S-U hyphen global.com. If you go there and you place an order, well first of all you get a free report there, number one, so go and get that, but if you do want to buy some of the bands and items they offer if you mention this radio show, Super Human Radio, you'll get a 10% discount. This is good
through for 30 days, so it's October 12th today if you're listening to this show late, if it's 30 days after that that coupon code is no longer available.

We're talking with Dr. James Stray-Gundersen. We're talking about KAATSU training. If you are a personal trainer and you want to add the certification and the equipment to your repertoire of offerings you need to go to KAATSU-global.com: K-A-A-T-S-U hyphen global.com. This is a very, very serious science here. This is not where you put some ropes or bands around your client's arm.

The equipment gives read-back, it gives feedback and it explains what you're doing right, what you're doing wrong. It allows you to guide – you know and this is something really not just for the average person, but for those professionals out there who are bodybuilders who want to try to take their body to a different level that they just can't get with the type of training they're doing now. I have a feeling that KAATSU will open amazing opportunities for growth in those individuals.

So real quick two topics I want to cover and then we can wrap it up with whatever else you want to talk about. Certain supplements seem to influence this phenomenon either in a positive or negative aspect I'm thinking. I don't know if this is true that's why I'm asking you.

Beta-analine has been shown to quench hydrogen ions, allowing endurance athletes to train longer without the burn so to speak, the lactate buildup. Would that be a non-starter, a not a good supplement to use if you're looking to use KAATSU?

Dr. Stray-Gundersen: No, I think beta-analine would be great. You know let's take nutrition as a kind of general topic. I know there's lot more here. But I think the way that nutrition, whatever nutrition the person is applying that KAATSU just amplifies the effect of this. So if the nutrition is intended to build big muscle then that's what's going to happen with the combination of the nutrition that's going in and the other training that's going on, as well as that KAATSU frosting if you will.

If it's an endurance thing then that connotates a certain kind of diet and then also a certain kind of other training and then KAATSU can amplify those sorts of things. So for example it's been shown that muscle that gets built with kind of endurance-type training ends up having the characteristics of that kind of muscle all the time. You know the athletes don't necessarily gain any weight. In sports where you don't want to gain weight you can use KAATSU in a way that combined with your nutrition and your exercise such that you don't, you don't gain weight. Where on the other hand bodybuilders or other strength kind of athletes they want to gain weight, so then their nutrition dictates kind of the way that this goes.

Now one of the things back to beta-analine specifically just the idea that you have good intracellular buffers is still a good thing, it's just mean that the degree of impeding of blood flow needs to be a little bit greater than it otherwise would be. This is where we see these kind of things. So after you get done with your KAATSU session and you've done let's say three to five different exercises and you've gotten that failure signal at least in the third set of each one of those exercises, then in retrospect you know you did a good job. Whether you have beta-analine onboard, whether you don't, whether you are using creatinine or all those sorts of things they just set the stage for the muscle to adapt in a better way to a stronger stimulus.

Carl Lanore: Okay good because then you answered the question about a nitric oxide donor as well like you know L-arginine or something like that.

Dr. Stray-Gundersen: Yeah right.

Carl Lanore: Okay. What about strength? Is there any evidence that KAATSU training actually effects neuromuscular adaptation in the same way that handling heavy weight does?

Dr. Stray-Gundersen: Well I'd kind of answer it this way, you know one of the things is you get increases in strength with KAATSU within two weeks. I would say that most people think that that's just because we've gotten better motor activation, better coordination and we really haven't done anything to the muscle itself. But that's not the case. We do get those enhancements of the motor coordination and all that kind of stuff, but we're still getting protein building going on in the muscle and as I was kind of alluding to earlier that because we haven't done the damage we don't have to dig ourselves out of this hole that takes you know four-to-six weeks.

Carl Lanore: Right.

Dr. Stray-Gundersen: We can just start going right from get-go. So I would say that the degree of skill acquisition and all those sort of things is the same with KAATSU as it is with other sorts of sports or other sorts of weightlifting.

Now let me illustrate one thing is one of the things that I love doing with all of my athletes is I ask them to put the KAATSU bands on and then they have to try to do some skill activity that they may have been doing. For example juggling a soccer ball or throwing a baseball or hitting a baseball, all these things that are highly technically oriented and with the KAATSU bands on at the right pressures they're just horrible at it.

That does a couple of things. One is these are already well accomplished people and they don't like not being good at what they're sport is and so it forces them to focus on the very specific motor tasks that are involved. Then because they renewed their focus on these activities, plus their muscles are getting more fatigued than they otherwise would they get a really robust response. And very shortly they're on one hand juggling soccer balls really well again with the KAATSU bands on and then on the pitch they're even better than they were before.
Carl Lanore: And so then when they take the bands off since they've had to focus more and get more neuromuscular inroads and control with the bands on when they take them off they're actually even better than they were before.

Dr. Stray-Gundersen: Exactly. So here's the thing, one of the things that is a critical component of all sports is when fatigue sets in you still have to do things and in exactly the right way whether that's catch that football or hit that jump shot or score that goal, all these things are very critical, technical things that are not done well when the individual is fatigued. KAATSU teaches you to operate under those conditions of fatigue so that you then do those things better when you don't have the KAATSU bands on.

Carl Lanore: We only have a few minutes. Are there any contraindications that someone should not get into KAATSU? Like let's say they've been diagnosed with peripheral artery disease and they don't want to put bands on their lower legs am I right about that or no?

Dr. Stray-Gundersen: The short answer is there's pretty much no contraindications to KAATSU. There's a couple of situations where we take extra care. One example for example is a woman who's had breast cancer and has had the lymph nodes in her armpit removed or the lymph nodes have been radiated, which produces a situation where generally they're advised not to put blood pressure cuffs on their arms or get blood drawn on that side. We similarly with an abundance of caution try not to put the bands on that arm. But the other three extremities they're still good to go for KAATSU.

Carl Lanore: Right.

Dr. Stray-Gundersen: That ends up being just fine.

Carl Lanore: Oh yeah because there's actually a cross-education. We know that if you train one leg, the other leg gets something out of it anyway, so there's probably some real benefits to that.

Dr. Stray-Gundersen: Exactly.

Carl Lanore: Yeah, yeah.

Dr. Stray-Gundersen: Exactly. So you know there are things and this is part of the educational process, there are things where we have to modify exactly what we do and we don't do, but suffice it to say that there's a way to KAATSU everybody in a safe manner.

So for example you were talking about the peripheral artery disease in let's say a senior for example. There we're not going to use very high pressures, but we don't need too because we can end-up getting that KAATSU effect with a combination of low pressures and easy exercises that work for them and doing so such that we don't damage any arteries that are already diseased.

Carl Lanore: I have to believe that the hemodynamic changes would actually be beneficial to arteries because we know that heavy load-bearing exercise over long periods of time actually makes arteries and veins more resilient, more elastic, and improves intima, thickness, and function. So I got to believe that allowing them to achieve that level of let's say almost what occurs in a Valsalva-type of a maneuver, achieve that kind of blood vascular pressure changes, but without doing a lot of strenuous work has to be beneficial to them.

Dr. Stray-Gundersen: Absolutely. Again this gets back to that key to KAATSU which is when it's done properly there's low loads involved. You don't have to go to the extremes that you normally have to go to to get the effects to happen.

Carl Lanore: Yeah. Listen we've run out of time. This is a fantastic interview. We're happy to have Dr. Gundersen back on the air. If you have questions that we didn't cover please e-mail them to onair@superhumanradio.com and I promise we'll have him back on and cover it at a later time.

This is brilliant and the website is fantastic, KAATSU-GLOBAL.com

Whether you are an end user or you are a personal trainer you must go to that website. Download the free report, but more importantly checkout the equipment, get certified and offer KAATSU training to your clients, it's a great idea.

Listen, thanks for being on the show today Dr. Gundersen.

Dr. Stray-Gundersen: Oh, you're more than welcome.

Carl Lanore: Take care.
KAATSU Research Activities

Research on KAATSU has ranged from equine subjects to human athletes and has included mice, rats, goats and people of various ages. Research has been conducted at the University of Tokyo Hospital and Osaka University in Japan, at Peking University and Jilin University in China, at the Harvard Medical School and University of Missouri in the United States, at the Hospital Israelita Albert Einstein in São Paulo, Brazil, and many other universities and academic research institutions.

The photos above show Chinese scientists attaching regular KAATSU Air Bands on the hind legs of goats in northern China under the auspices of China’s State General Administration of Sports, the government agency responsible for sports in China that also administers the Chinese Olympic Committee.

In the United States, Dr. James Stray-Gundersen, Chief Medical Officer of KAATSU Global, is leading the research direction and activities of KAATSU in a variety of applications and areas.

At the SG Performance Medicine Center and Sport Technologies in the United States Ski & Snowboard Association’s Center of Excellence in Park City, Dr. Stray-Gundersen first used a variety of equipment to monitor the effects of KAATSU on athletes.

His tools included the First Beat Body Guard (heart rate monitor and accelerometer), MOXY Near Infrared Spectroscopy (SmO2 and muscle oxygen saturation), Sonosite MicroMaxx Doppler Ultrasound (arterial and venous blood flow), and Nelcor Pulse Oximeter (SpO2 and arterial oxygen saturation).

He first presented his findings in Tokyo, Japan at the 10th KAATSU International Symposium at the University of Tokyo.
He then presented his work and recommendations in London, England at the Elite Sports Expo.

Dr. Stray-Gundersen will present his latest findings and mechanism of KAATSU at the Joseph B. Martin Conference Center at the Harvard Medical School on November 5th - 6th at the KAATSU Symposium in Boston.

For more information on the KAATSU Symposium, visit the KAATSU website.

Since 2013, Dr. Stray-Gundersen has gained experience from thousands of sessions in hundreds of clients encompassing people of both genders, from 9-90 years of age, levels of fitness from Olympians to sedentary, with a wide variety of musculo-skeletal problems that are aided by KAATSU Training.

Dr. Stray-Gundersen received his Board Certification in General Surgery in 1985. He then completed Post Doctoral Fellowships in Cardiovascular Physiology and Human Nutrition at The University of Texas Southwestern Medical School (UTSW) where he received appointments as Assistant Professor in the Departments of Orthopedic Surgery, and Cardiology. While on faculty, over 20 years at UTSW, Dr. Stray-Gundersen conducted research and built and directed two World Class Human Performance Centers associated with leading hospitals, St. Paul and Baylor. Dr. Stray-Gundersen's primary interest and area of research is human performance, the physiology of health and fitness/wellness through exercise prescription, markers of over training, nutrition as it applies to performance and health, altitude acclimatization and training (pioneered Live Hi/Train Low), and anti doping (developed anti doping test SAFE – Safe and Fair Events).

Since 1984, Dr Stray-Gundersen has worked with numerous Olympians in various sport disciplines advising on training for Maximal Human Performance and has an on-going relationship with the great runner and director of the NIKE Oregon Project, Alberto Salazar. Dr. Stray-Gundersen has been active in the fight against doping, particularly, blood doping. He, along with colleagues Dr. Tapio Videman and Dr. Ingaard Lereim, they performed the the first non-invasive anti-blood doping testing at the 1989 World Championships in Lahti, Finland and his work continued with the development and implementation of the SAFE Test — Safe and Fair Events — which was the precursor for the Hematologic passport, considered by some to have minimized the extent and magnitude of blood doping in International Sport.

He has been an official physician/consultant/staff of United States, Norwegian, and Canadian Olympic Teams, and an official staff member of numerous World Championships in the sports of cross country skiing, nordic combined, ski jumping, alpine skiing, speed skating, biathlon, track and field, road cycling and swimming.

Dr Stray-Gundersen has served and consulted for many International Medical Committees that include the International Olympic Committee (IOC), International Football Federation (FIFA), International Biathlon Committee (IBU), International Ski Federation (FIS), and the International Skating Union (ISU). He has worked with the World Anti Doping Association (WADA) and the US Anti Doping Agency (USADA). Dr. Stray-Gundersen is the Sports Science Advisor for the US Ski and Snowboard Association (USSA), and continues to lead Human Performance and Altitude Camps for Olympic Athletes, Masters Athletes, as well as Navy SEALs to optimize performance.
KAATSU Terminology

Air Bladder: the pneumatic bladder inside the KAATSU Air Bands and KAATSU Aqua Bands that inflate and deflate in specific amounts (Standard KAATSU Units) controlled by the KAATSU Master, KAATSU Nano or KAATSU Cycle equipment.

All-out: to exercise or do KAATSU Training with maximum effort.

Base Pressure: the compression of the noninflated KAATSU Air Bands and KAATSU Aqua Bands when the Air Bands are first manually affixed to the limbs. Also known as Base SKU and measured in SKU (Standard KAATSU Units).

Base SKU: the compression of the noninflated KAATSU Air Bands and KAATSU Aqua Bands when the Air Bands are first manually affixed to the limbs. Also known as Base Pressure and measured in SKU (Standard KAATSU Units).

BFR: an acronym for Blood Flow Restriction training, also known as occlusion training or tourniquet training. The blood flow restriction in the limbs is caused by the tightening of knee wraps, ropes, tubing, or blood pressure cuffs around the limbs. BFR is not KAATSU Training.

Bicep Curl: any type of weight training or resistance exercises or KAATSU Training that target the biceps branchii muscle where the hands are raised towards the shoulders until the forearms are vertical with the elbows and upper arm remaining close to the body.

Capillary Refill Time (or CRT): the time in seconds taken for color to return to an external capillary bed (e.g., in the palm of the hands or above the knee on the quadriceps) after pressure is applied by a thumb to cause blanching. Also referred to as CRT in the KAATSU Master, KAATSU Nano or KAATSU Cycle equipment.

Central Nervous System: the complex of nerve tissues in the brain and spinal cord that controls the activities of the body.

CNS: an acronym for Central Nervous System.

CRT: an acronym for Capillary Refill Time or the time in seconds taken for color to return to an external capillary bed (e.g., in the palm of the hands or above the knee on the quadriceps) after pressure is applied by a thumb to cause blanching.

CYCLE 20: an 8-step process of releasing and applying pressure on either the upper arms or upper legs. One cycle includes the application of pressure for 20 seconds and the subsequent release of pressure for 5 seconds. There are 8 cycles in the CYCLE 20 process that takes 3 minutes 20 seconds in duration with a Base SKU of 15 and an Optimal SKU of 100. This function is in the KAATSU Master, KAATSU Nano and KAATSU Cycle equipment.

CYCLE 40: an 8-step process of releasing and applying pressure on either the upper arms or upper legs. One cycle includes the application of pressure for 40 seconds and the subsequent release of pressure for 10 seconds. There are 8 cycles in the CYCLE 40 process that takes 6 minutes 40 seconds in duration with a Base SKU of 20 and an Optimal SKU of 150. This function is in the KAATSU Cycle equipment.

CYCLE 60: an 8-step process of releasing and applying pressure on either the upper arms or upper legs.
One cycle includes the application of pressure for 60 seconds and the subsequent release of pressure for 20 seconds. There are 8 cycles in the CYCLE 60 process that takes 10 minutes 40 seconds in duration with a Base SKU of 25 and an Optimal SKU of 200. This function is in the KAATSU Cycle equipment.

Disturbance of homeostasis: the state when the body’s natural internal environmental variables become disturbed and feedback is initiated to the central nervous system due to the engorgement of blood caused by KAATSU Training.

Go to failure: to continue exercising or moving until maximum effort has been reached and no more movement can be done or repetitions can be repeated.

Hand Clenches: an exercise where the hand is opened and closed to work the muscles of the hands and forearms. It is part of the 3-point Exercises for the Arms.

Heel Raises: an exercise where the heels are raised from the floor while either sitting down or standing up. It is part of the 3-point Exercises for the Legs.

KAATSU: a Japanese trademark meaning “additional pressure”, the original form of blood flow moderation training, rehabilitation and recovery invented and developed by Professor Sir Yoshiaki Sato, M.D., Ph.D., FNAI.

KAATSU Air Bands: specialized pneumatic bands that are affixed to the arms or legs with Velcro. The air bladder inside the Air Bands are inflated and deflated by the firmware of the KAATSU Master, KAATSU Nano and KAATSU Cycle equipment.

KAATSU Arm Bands: specialized pneumatic bands that are used around the upper arms for KAATSU Training.

KAATSU Aqua Bands: specialized pneumatic bands that are used around the upper arms and upper legs for KAATSU Aqua, a form of KAATSU Training that can be performed in swimming or therapy pools.

KAATSU Aqua Training: blood flow moderation training or rehabilitation performed in the water in the form of swimming, aqua-therapy or other forms of aquatic exercises performed with KAATSU Aqua Bands.

KAATSU Color: the resultant pinkness, rosiness or beefy redness in the skin in the limbs due to the engorgement of blood during KAATSU Training.

KAATSU Cycle: (1) brand name of KAATSU equipment, or (2) a means to warm-up the body for KAATSU Training with the KAATSU Master, KAATSU Nano or KAATSU Cycle equipment. It is a type of KAATSU Training, therapy and recovery that involves either a 4 or 8 step process of releasing and applying pressure on the limbs at increasing levels of compression.

KAATSU Dose: the appropriate Base SKU and Optimal SKU that is specific for a given individual based on their age, physical condition, and amount of KAATSU Training experience.

KAATSU Instructor: an individual certified by KAATSU Japan Co., Ltd. to have studied and passed the KAATSU Specialist certification examination.

KAATSU Leg Bands: pneumatic bands that are used around the upper legs for KAATSU Training.

KAATSU Master: a portable 1134g (2.5 lbs.) touch-screen device that provides specific amounts of compressed air to the KAATSU Air Bands while recording and monitoring various data including Base SKU, Optimal SKU, time of KAATSU training, and capillary refill time.

KAATSU Master Instructor: an individual certified by KAATSU Japan Co., Ltd. to have studied and passed the KAATSU Specialist certification examination and completed the highest level of KAATSU Training in Japan.

KAATSU Nano: a portable handheld 263g (9.7 oz.) touch-screen device that provides specific amounts of compressed air to the KAATSU Air Bands while recording and monitoring various data including Base SKU, Optimal SKU, time of KAATSU Training, and capillary refill time.

KAATSU Pressure: the compression of the KAATSU Air Bands or KAATSU Aqua Bands around the limbs as measured in SKUs or Standard KAATSU Units.

KAATSU Protocols: the standard KAATSU procedures and know-how that enable safe and effective KAATSU Training and rehabilitation for individuals of all ages and conditions. Invented by Professor Sir Yoshiaki Sato, M.D., Ph.D., FNAI in 1966 and since patented.

KAATSU Specialist: an individual certified by KAATSU Global, Inc. to have studied and passed the KAATSU Specialist certification examination.

KAATSU Training: the original form of blood flow moderation training, rehabilitation and recovery invented and developed by Professor Sir Yoshiaki Sato, M.D., Ph.D., FNAI.

Leg Curls: an exercise to primarily work the hamstring by raising the foot backwards to the gluteus maximus. It is part of the alternative 3-point Exercises for the Legs.

Muscular Failure: the point in KAATSU Training or rehabilitation where no continued movement or additional exercise can be performed.
Non-lock Exercises: exercises where there is only partial extension of the limbs so the muscles are always engaged during KAATSU Training.

Occlusion training: blood flow restriction training to the limbs caused by the tightening of knee wraps, ropes, tubing or blood pressure cuffs around the limbs. Also known as BFR training or tourniquet training. Occlusion training is not KAATSU Training.

Optimal Pressure: the compression of the inflated KAATSU Air Bands after the Air Bands have been inflated according to the KAATSU protocols. Also known as Optimal SKU and measured in SKU (Standard KAATSU Units).

Optimal SKU: the compression of the inflated KAATSU Air Bands after the Air Bands have been inflated according to the KAATSU protocols. Also known as Optimal Pressure and measured in SKU (Standard KAATSU Units).

Petechiae: bleeding under the skin that can occur from broken blood vessels. It appears as tiny pinpoint red dots on the skin of the upper arm in some people as a result of KAATSU Training.

Pulsation: the rhythmical throbbing of an artery that is felt under the KAATSU Arm Bands or KAATSU Leg Bands.

Rep: a motion or exercise (such as a bicep curl or push-up) that is repeated and counted during KAATSU Training. Also referred to as a repetition.

Repetition: a motion or exercise (such as a bicep curl or push-up) that is repeated and counted during KAATSU Training. Also referred to as a rep.

SKU: Standard KAATSU Unit, approximately equivalent to mmHg as measured by the original KAATSU Air Sensor for the KAATSU Air Bands.

Squat: an exercise that trains primarily the muscles of the thighs, hips, gluteus maximus, quadriceps, and hamstrings by bending the knees and hips to lower the torso and returning to the standing position. It is part of the alternative 3-point Exercise for the Legs.

Technical failure: the point in KAATSU Training or rehabilitation where muscular movement can be performed but the proper technique is poor or lost or where the original form and/or speed is compromised.

Tourniquet training: blood flow restriction training to the limbs caused by the tightening of knee wraps, ropes, tubing or blood pressure cuffs around the limbs. Also known as BFR training or occlusion training. Occlusion training is not KAATSU Training.

3-point Exercises: a set of 3 different exercises that help indicate the Optimal SKU and can form the basis of KAATSU Training or serve as a warm-up.

3-point Exercises for Arms: a set of 3 different exercises for the arms that include 3 – 4 sets of hand clenches, 3 – 4 sets of bicep curls, and 3 – 4 sets of triceps extensions. The hand clenches can be done with hand grips if desired. The bicep curls can be done with light weights if desired. The triceps extensions can be done with light resistance if desired.

3-point Exercises for Legs: a set of 3 different exercises for the legs that include 3 – 4 sets of either toe curls (performed without shoes), toe raises and heel raises. These exercises can also alternatively include leg curls or squats.

Toe Curls: an exercise that works the toes and feet when the toes are curled under the foot. It is part of the 3-point Exercises for the Legs.

Triceps Extension: a strength-building exercise that stimulate the triceps in the upper arms. It is part of the 3-point Exercises for the Arms.
Kyle J Hackney, Meghan Everett, Jessica M Scott and Lori Ploutz-Snyder wrote a paper on Blood Flow-restricted Exercise In Space that was published in the Journal of Extreme Physiology & Medicine in 2012.

The electronic version of this article is online here.

It is known that prolonged exposure to microgravity in space results in chronic physiological adaptations including skeletal muscle atrophy, cardiovascular deconditioning, and bone demineralization. To attenuate the negative consequences of weightlessness during spaceflight missions, crew members perform moderate- to high-load resistance exercise in conjunction with aerobic (cycle and treadmill) exercise.

Recent evidence from ground-based studies suggests that low-load blood flow-restricted (BFR) resistance exercise training can increase skeletal muscle size, strength, and endurance when performed in a variety of ambulatory populations. This training methodology couples a remarkably low exercise training load (approximately 20%-50% one repetition maximum (1RM)) with an inflated external cuff (width, ranging between approximately 30-
The nuance of defining KAATSU as Blood Flow Moderation Training versus Blood Flow Restriction Training (or the commonly used terms such as Occlusion Training or Tourniquet Training) is important. KAATSU Specialists know that both pressures (i.e., Base SKU and Optimal SKU) of their clients and patients is important to identify and utilize.

- KAATSU Air Band width and placement are very important. KAATSU arm bands are 30-33mm and KAATSU leg bands are 50-53mm. The authors only describe one width and some of the widths are not standard KAATSU widths.

- KAATSU Specialists understand the net result of the systemic effect due to KAATSU. The authors do not mention that other muscles proximal to the bands (e.g. core or contra-lateral muscle) also benefits from KAATSU.

- There is no description of the mechanism of how KAATSU modifies blood flow or about obstruction of venous outflow which leads to backing up and congesting the distal extremity.

- There is no description about how muscle contraction itself restores circulation by squeezing venous blood past the KAATSU Air Band.

Dr Sato and certified KAATSU Specialists generically define KAATSU as "blood flow moderation training", not BFR (blood flow restriction).

The nuance of defining KAATSU as Blood Flow Moderation Training versus Blood Flow Restriction Training (or the commonly used terms such as Occlusion Training or Tourniquet Training) is important.

KAATSU is a means to moderate blood flow both in and out of the limbs. This is why the KAATSU Cycle is so important. This is also why the Base SKU (i.e., manual tightening of the KAATSU Air Bands) in combination with Optimal SKU (i.e., inflation of the KAATSU Air Bands) is so important in setting the pressures to achieve maximum benefits from KAATSU. The term "restriction" only implies that blood is reduced or restricted going OUT of the limb. The term "occlusion" implies that the blood flow is reduced and restricted going IN the limb.

However, the interaction of the blood flow both in and out of the limb during the KAATSU Cycle and KAATSU Training is vitally important to realize the full benefits of KAATSU.
Mike Allcord is an experienced Dive Master at the New England Aquarium who spends a lot of time in the Giant Ocean Tank, a huge tank simulating a Caribbean coral reef where bonnethead sharks, sea turtles, stingrays, moray eels, barracuda, and many smaller reef-living fish reside.

The 77-year-old hardened veteran of the open water is also a blazing fast masters swimmer.

Allcord is coached and was trained on KAATSU by Olympic swim coach Chris Morgan at Boston University.

He does the KAATSU Cycle regularly at his appropriate Base SKU and Optimal SKU levels. He recently noticed something that he brought up to Coach Morgan. “I just started kick biking again, since the weather has improved. I noticed that when I grab the handlebar that I have no pain in my hands. Last summer, whenever I kick biked my hands consistently hurt due to arthritis which had been diagnosed. Is it possible that KAATSU has caused this pain relief? If it is, that’s truly amazing and a wonderful, unanticipated effect.”

KAATSU inventor Dr. Sato explained the mechanism behind the apparent pain relief that many KAATSU users feel. “We have found that KAATSU Training and the KAATSU Cycle leads to a decrease in CRP, C-reactive protein which is a blood test marker for inflammation in the body. CRP levels increase in response to inflammation. This is why people who have arthritis or are experiencing different kinds of pain report feeling relief after bouts of KAATSU. While there is also an increase in HGH (Human Growth Hormone), nitric oxide, IGF-1 (insulin growth factor) and VEGF (vascular endothelial growth factor), KAATSU also has shown to decrease CRP.

Typically with pain comes inflammation and the CRP increases. But with KAATSU, the decrease in CRP and production of EPC (endothelial progenitor cell) help. EPC are cells that help regenerate the endothelial lining of your blood vessels and is great for people like Mike.”
When the timing and/or firing of one leg of a sprinter or runner is slower than the other leg, KAATSU Specialists know to focus KAATSU on the weaker or slower leg first.

Experienced KAATSU Specialists do several KAATSU Cycles at increasingly higher Optimal SKU pressures on the KAATSU Nano or KAATSU Master 2.0. For example, on a world-class athlete, they can use a Base SKU pressure of 25-30 SKU and an Optimal SKU Pressure over 300 SKU. Gradually, the Optimal SKU can increase over the course of several KAATSU Cycles.

Then the KAATSU Specialists untether the KAATSU Air Bands and do normal training or rehabilitation exercises under the direction of their coach or therapist. This can include stretching or specific movements, done slowly and steadily or rapid fire depending on the guidance of the coach.

As the KAATSU Cycle and KAATSU Training continues, the body starts to produce Human Growth Hormone, nitric oxide, VEGF (vascular endothelial growth factor), and beta endorphins as their level of CRP (C-reactive protein) starts to decrease. All the factors enable the athlete to feel better. Some describe the sensation as “feeling lighter or smoother - and faster.”

Additionally, if increased speed is desired or required, the athlete can be directed to do several KAATSU Cycles at increasingly higher SKU pressures on the KAATSU Nano or KAATSU Master 2.0 as they do specific movements. Then they can untether the KAATSU Air Bands and do normal training exercises as race pace.

Olympic swim coach Chris Morgan prefers to focus his athletes on their ‘race pain’ rather than their race pace. “I want them to experience the discomfort that they will face in a competition. With the KAATSU Air Bands or KAATSU Aqua Bands on, they can almost always get to that feeling. Over time, this helps them improve significantly as they start to be able to engage a greater percentage of their muscle fibers and deliver more blood to the exercising muscle as well as flush out the lactic acid more efficiently.”

Different arm and leg exercises are shown above by Justin Gatlin, a multiple Olympic medalist, who learned KAATSU directly from Dr. Yoshiaki Sato, the KAATSU inventor, at his office in Tokyo.
Dr. Satoh of the Satoh Clinic in Ube City, Japan presented a clinical study entitled Kaatsu Training: Application to Metabolic Syndrome where he applied KAATSU to patients with metabolic syndrome.

His goal was to evaluate the effect of KAATSU on patients with hypertension, diabetes mellitus, dyslipidemia, and obesity with metabolic syndrome.

Dr. Satoh asked 18 patients to do the standard KAATSU 3-Point Exercises for 6-12 minutes, once or twice a week with a Borg scale at level 13. The usefulness of KAATSU was evaluated after 3-4 months. The patients were instructed not to change their lifestyles (e.g., food, medicine and exercise).

Dr. Satoh (note: no relation to KAATSU inventor Dr. Yoshiaki Sato of Tokyo) reported the following results: The effectiveness of KAATSU was shown in 31 out of 51 patients (61%). In 12 out of 18 patients (67%) with hypertension, systolic blood pressure dropped from an average of 166 mmHg to 146 mmHg and diastolic blood pressure also dropped from an average of 96 mmHg to 86 mmHg.

In 6 out of 10 patients (60%) with diabetes mellitus, HbA1c dropped from an average of 6.8% to 6.12%.

In 8 out of 14 patients (57%) with dyslipidemia, LDL-c decreased from an average of 158 mg/dl to 136 mg/dl. In 5 out of 9 patients (56%) with obesity, there was a reduction in weight from an average of 67 kg to 59 kg.

The doctor concluded that KAATSU improves physical conditions including hypertension, diabetes mellitus, dyslipidemia and obesity with metabolic syndrome.

INTRODUCTION
Metabolic syndrome is defined as a condition of visceral fat accumulation with a combination of two or more of hyperglycemia, hypertension or dyslipidemia. These closely resemble the symptoms of somatopause which is the condition of decreasing growth hormone (hereafter GH) secretion with aging.

On the other hand, KAATSU has brought about a variety of good effects in muscle strength (Takarada et al., 2000; Abe et al., 2005), lipolysis (Satoh, 2011) and health promotion. KAATSU has also been applied in the field of medical care (Nakajima et al., 2007). In my clinic, exercise therapy, especially walking, has become valued for the treatment and prevention of metabolic syndrome (Satoh, 1990). Nevertheless, in cases of patients with a walking disturbance or patients who cannot spare one hour or more for walking, KAATSU has been proactively introduced and good results were obtained.
2006). This method can be performed in a short period of time, without placing a burden on the knees and the lower back. Furthermore, it is believed that there is a good effect even with metabolic syndrome because of the secretion of GH. Therefore, the effectiveness of KAATSU on metabolic syndrome was evaluated in this study.

METHODS
The subjects of this study were 51 patients with metabolic syndrome (14 males and 37 females) out of 96 patients treated with KAATSU so far at my clinic.

The ages of these subjects were as follows: 3 in their 30’s, 5 in their 40’s, 9 in their 50’s, 12 in their 60’s, 10 in their 70’s, 10 in their 80’s and 2 in their 90’s. The diseases of subjects were as follows: 18 patients with hypertension (7 males and 11 females), 10 patients with diabetes mellitus (3 males and 7 females), 14 patients with dyslipidemia (4 males and 10 females), and 9 patients with obesity (1 male and 8 females).

The criteria of indication for KAATSU were as follows:

- Hypertension: Systolic blood pressure, 150 mmHg - 170 mmHg, Diastolic blood pressure, 90 mmHg - 100 mmHg
- Diabetes mellitus: HbA1c levels of 6.5% or above
- Dyslipidemia: LDL cholesterol levels of 140 mg/dl or above
- Obesity: BMI levels of 28 or above

However, patients with a resting blood pressure of 170 / 100 mmHg or above were excluded from the subjects because they could be considered at danger of a rise in pressure during KAATSU training. Fasting blood samples were taken early in the morning and body weight was measured with the Body Composition Analyzer MC190 (TANITA Corporation, Tokyo). The kinetics of GH secretion before and after KAATSU was examined in one elderly patient to confirm the results reported before, since the levels of GH in previous studies were checked only in young athletes (Takarada et al., 2000) or healthy males (Takano et al., 2006).

KAATSU TRAINING PROTOCOLS
Before KAATSU was applied, there was first a 10-minute period of stretching of the entire body. Then, the KAATSU belts (Sato Sports Plaza, Tokyo) were coiled around the proximal end of either the arms or the legs. After this, the pneumatic control type KAATSU Training Device (the KAATSU-Master or the KAATSU-Mini, Sato Sports Plaza, Tokyo) was connected to those belts, and KAATSU was performed for a period of 6-12 minutes under an appropriate pressure (60 to 160 mmHg for the arms and 80 to 200 mmHg for the legs respectively). The appropriate pressure was set so as the patients didn’t feel pain in the distal portion to the KAATSU belt during the exercise. The content of KAATSU was a 3-exercise set of training (Sato Y, 2007a); that is, (1) an opening and shutting movement of both the fingers and the toes at the same time, (2) an extension and a flexion of the arms (arm curl) and the feet (toes raise) at the same time, and (3) a pushing the both fists which are placed in front of the chest down obliquely to behind, with stretching the elbows (push down) and the heels up (calf raise) at the same time. Each 3-exercise set was performed 30 times with 20 second resting intervals.

This exercise intensity was equivalent to the Borg scale of level 13 (somewhat hard). KAATSU was performed once or twice a week.

EVALUATION OF THE EFFECTIVENESS
For the exact evaluation, the purpose of this study was sufficiently explained to the patients and they were instructed not to change their lifestyle (food, exercise, and medicine). Nevertheless, some patients changed their lifestyle during this study and they were therefore excluded from the assessment. The evaluation of the effect was done 3 to 4 months later.

The criteria of effectiveness were as follows:

- Hypertension: Drop in systolic and diastolic pressure of 10% or above
- Diabetes mellitus: Drop in HbA1c of 10% or above
- Dyslipidemia: Decrease in LDL cholesterol of 8% or above
- Obesity: Weight loss of 10% or above

Statistical methods

All values are expressed as means ± S.D.

RESULTS
There were no accidents in this study.

KAATSU was effective against metabolic syndrome in 31 patients (61%), and ineffective in 11 patients (22%). A total of 9 patients (17%) were excluded.

Among the excluded cases, 6 patients changed their lifestyles during this study; 5 patients added diet or exercise therapy by themselves, seeking further improvement because they had seen the effectiveness of KAATSU before the evaluation, and a patient had his medical treatment changed by another clinic during the study. Furthermore, 3 patients withdrew themselves from the study because no effects had appeared; 2 patients had diabetes mellitus and the other one had dyslipidemia.

KAATSU decreased blood pressure in 12 out of 18 patients with hypertension (67%). In systolic blood pressure, there was an average drop from 166 ± 5.98 mmHg to 146 ± 1.15 mmHg and the average drop rate was -12 ± 2.87%. In diastolic blood pressure, there was an average drop from 96 ± 2.68 mmHg to 86 ± 2.88 mmHg and the average drop rate was -10 ± 2.24%. Among the 2 excluded cases, one patient added walking to his lifestyle by himself and the other patient who attended a different clinic had his medication reduced by the attending physician.

There were no accidents in this study.
KAATSU was effective in 6 out of 10 patients with diabetes mellitus (60%): HbA1c dropped by an average of 6.8 ± 0.31% to 6.12 ± 0.29% and the average of drop rate was -10 ± 0.56%. There were 3 excluded patients in this group. A patient restricted her eating habits (snacks between meals) by herself and the other 2 patients discontinued KAATSU 2 months after starting without seeing a drop in HbA1c.

KAATSU was effective in 8 out of 14 patients with dyslipidemia (57%): LDL-c decreased by an average of -14 ± 2.62% in 158 ± 12.60 mg/dl to 136 ± 6.99 mg/dl. Among the 2 excluded patients, one patient restricted her eating habits (snacks between meals) by herself, and the other patient discontinued KAATSU treatment because LDL-c didn’t drop. KAATSU was also effective in 5 out of 9 patients with obesity (56%): There was an average reduction in body weight from 67 ± 4.26 kg (BMI 28.7±1.82) to 59 ± 3.30 kg (BMI 25.2±1.41) and by an average of -12 ± 1.91 (BMI -12 ± 0.48%). There were 2 patients excluded because they restricted their eating habits (snacks between meals).

For additional details on this study, visit the Research Page on the KAATSU Global website here.

KAATSU ARM 3-POINT EXERCISES [REFER TO ILLUSTRATIONS ABOVE]
The KAATSU 3-point Exercises for the arms involves hand clenches, bicep curls and tricep extensions. Each set of exercises should be done 3-4 times each with a maximum of 20 seconds rest between each set. Ideally, the number of repetitions for each exercise decreases before the user reaches muscular or technical failure* (or fatigues).

That is, an ideal set would be 25-30 repetitions on set #1, 10-15 repetitions on set #2, and 5-10 repetitions on set #3. Even if only 1-2 repetitions are completed on the last set, this failure signal sent to the central nervous system is one of the goals of KAATSU.

KAATSU LEG 3-POINT EXERCISES [REFER TO ILLUSTRATIONS ABOVE]
The KAATSU 3-point Exercises for the legs are either defined as Standard or Advanced.

The Standard KAATSU 3-point Exercises for the legs involves toe curls, toe raises, and heel raises. These are all performed while the user is seated comfortably with good posture on a chair. In general, these are preferred for older or less fit individuals or those just starting an exercise program or KAATSU.

The Advanced KAATSU 3-point Exercises for the legs are alternatively used by more fit or active individuals or for those individuals with more experience in KAATSU. These 3 basic exercises includes heel raises, leg curls and squats. The heel raises can be done while sitting or standing. The leg curls can be performed while standing and holding onto a chair or balancing against a wall. The squats (or “chair touches”) can be performed while bending the knees to touch a chair and then popping back up.

Ideally, the squats are “non-lock” (partial extension) so that the muscles are constantly engaged and there is no rest while the knees are “locked” straight (in a full extension). This will build up fatigue and lactic acid more quickly.

Each set of exercises should be done 3-4 times each with a maximum of 20 seconds between each set. Ideally, the number of repetitions for each exercise decreases before the user reaches muscular or technical failure (or fatigues).

That is, an ideal set would be 25-30 repetitions on set #1, 10-15 repetitions on set #2, and 5-10 repetitions on set #3. Even if only 1-2 repetitions are completed on the last set, this failure signal sent to the central nervous system is one of the goals of KAATSU.
After anterior cruciate ligament (ACL) surgery, rehabilitation begins in order to help blood circulation, prevent blood clots from forming in your legs, and to prevent muscle atrophy.

Dr. Yoshiaki Sato worked with KAATSU Specialists in Japan to develop protocols to incorporate into post-ACL surgery rehabilitation.

With the approval of your physician and therapist, patients can begin KAATSU after the surgery if there are no complications. The patient can also do KAATSU on their other healthy limbs (i.e., healthy leg and both arms). The standard protocol includes the following:

1. Patients can do KAATSU Cycle daily, but they should also limit KAATSU to 15 minutes on the arms and 20 minutes on the legs during each session.

2. Do the KAATSU Cycle (i.e., 20 seconds of pressure on + 5 seconds of pressure off) first (before doing anything else). This will help prepare ("warm-up") the muscles, veins and capillaries before doing anything more strenuous.

3. One primary benefit of KAATSU is to reduce or eliminate muscle atrophy in the injured leg. In order to eliminate atrophy, patients should regularly do the KAATSU 3-Point Exercises on their legs.

4. With the KAATSU Air Bands at the appropriate Base SKU pressure (i.e., manual tightening) and Optimal SKU pressure (i.e., the inflated pressure), do 3 sets each of the following depending on how the patient feels, their range of mobility, and the length of time post-surgery:
   * toe curls
   * heel raises (or just rotating the ankles)
   * leg curls
   * repeated quadricep contractions
   * stretching
   * stationary bike riding
   * leg presses

5. Patients can do the same KAATSU 3-Point Exercises on their healthy leg and the following KAATSU 3-Point Exercises for their arms:
   * hand clenches
   * biceps curls
   * triceps extensions
   * stretching

6. As the patient becomes more mobile, simple walking (especially in the sand at the beach) with the KAATSU Air Bands on is beneficial. Patients can even do this at their home or office as they walk back and forth in their room. If patients do these exercises regularly, they should not see any muscle atrophy.

7. The skin should turn pink or reddish as the limb should experience an engorgement of pool in the limbs.

This information is for educational purposes only and is not intended to replace the advice of your doctor or therapist.
KAATSU is has received recognition and coverage in prominent and prestigious publications.

"Can You Work Out Less, Get More Results?"
By Eleanor Warnock and Rachel Bachman
The Wall Street Journal
With Kaatsu, people do a light workout while wearing pressurized belts, first on the upper arms and then on the legs.

"Could the Kaatsu Workout Be the Most Efficient Exercise?"
By WSJ Video
The Wall Street Journal
Japanese bodybuilder Yoshiaki Sato says he has a way for Hollywood’s aging action stars to stay as youthful and fit as ever.

"Kaatsu training is blowing fitness researchers' minds"
By Jon R. Anderson, Staff Writer
MilitaryTimes
Read the article and discover why so many people are so excited about KAATSU Training.

"You Should Probably Try This Japanese Blood-Flow Routine"
By Devon Jackson, Staff Writer
OutsideOnline.com
Footballers of both kinds have caught on. Here’s what you need to know.

Customer Service:
Call Toll-Free International +1-888-410-6350
e-mail: info@kaatsu-usa.com
Designed for performance, recovery, rehabilitation and wellness applications

- **Touch-screen tablet** offers personalized KAATSU Cycle options
- **Dual air compressors** enable each limb to be simultaneously inflated to different pressures
- **WIFI connectivity** enables automatic storage of user data in the KAATSU Cloud

www.kaatsu-global.com
The new KAATSU Master 2.0 is the fourth-generation KAATSU device that enables real-time monitoring and archiving of user’s physiological data. The 2.0 is ideal for use by individuals, corporations, organizations, physical therapy clinics, universities, hospitals, and teams.

2.0 is combined with the Masimo MightySat™ Finger Pulse Oximeter and a wrist blood pressure monitor that capture and archive your oxygen saturation, pulse rate, Perfusion Index, Pleth Variability Index and blood pressure readings in real-time.

FEATURES
- Designed for performance, recovery, rehabilitation and wellness applications
- Touch-screen tablet offers personalized and comprehensive KAATSU Cycle options
- Dual air compressors enable each limb to be simultaneously inflated to different optimally pressures
- WIFI connectivity enables real-time monitoring and automatic storage of data in the KAATSU Cloud
- Video feedback and interaction with KAATSU Master Specialists for real-time consultation
- Access to KAATSU Cloud where user information is automatically uploaded and archived
- Rechargeable battery
- Used with both the KAATSU Air Bands or KAATSU Aqua Bands (Small, Medium, Large or Extra Large) and certification for KAATSU Specialists

DATA MONITORING
Masimo MightySat™ Fingertip Pulse Oximeter and a Wrist Blood Pressure Monitor measures and monitors the following data during exercise or rehabilitation:
- Pulse Rate (PR) or the number of heart pulses per minute indicates your overall fitness and exertion levels
- Oxygen Saturation (SpO2) or the oxygen level in the blood indicates changes due to your heart or lung function, oxygen use by your body, and altitude
- Perfusion Index (PI) indicates the strength of blood flow to the finger as blood circulation changes
- Respiratory Rate (RRp) or the number of breaths per minute indicates how well your heart and lungs are functioning and how quickly you recover from exercise
- Pleth Variability Index (PVI) or the variation in perfusion index over your breathing cycle which may indicate changes in hydration, breathing effort, perfusion or other factors.
- Blood Pressure (BP) indicates your systolic blood pressure and diastolic blood pressure.

BENEFITS
- effective muscle toning
- improved circulation
- faster recovery from competition or vigorous workouts
- anti-aging benefits
- improved speed
- enhanced stamina
- increased strength
- greater range of motion
- significant time savings
- convenience - exercise anywhere anytime
- offers 6 levels of the KAATSU Cycle

PACKAGES
2.0 comes with 4 sets of KAATSU Air Bands or KAATSU Aqua Bands (Small, Medium, Large or Extra Large) and certification for KAATSU Specialists

2.0 ALSO MEASURES AND ARCHIVES ADDITIONAL INFORMATION INCLUDING:
- KAATSU Time (KT) or the amount of time spent doing KAATSU per session
- Capillary Refill Time (CRT) or the amount of time in seconds that it takes for your capillaries to refill with blood
- KAATSU Exercise (KE) or the type of exercise, movement or rehabilitation you do with KAATSU
- KAATSU Cycle Function (KCF) or the specific type of KAATSU Cycle (e.g., Cycle 20 or Customized Cycle)

BAND SIZES
KAATSU Air and Aqua Bands are available in 4 sizes: Small, Medium, Large and Extra Large. Measure the circumference of the top of your arm (right by your armpit) and the circumference of the top of your leg (right alongside your groin). Those circumferences will determine the appropriate size for your KAATSU Air Bands.

ARMS
Small: less than 18 cm (7.06 inches)
Medium: 18 - 28 cm (7.06 - 11.02 inches)
Large: 28 - 38 cm (11.02 - 14.96 inches)
Extra Large: 38 - 48 cm (14.96 - 18.89 inches)

LEGS
Small: less than 40 cm (15.74 inches)
Medium: 40 - 50 cm (15.74 - 19.68 inches)
Large: 50 - 60 cm (19.68 - 23.62 inches)
Extra Large: 60 - 70 cm (23.62 - 27.55 inches)