



CENTRE FOR DIALOGUE  
SIMON FRASER UNIVERSITY



Conversations  
**That  
Matter**



Okay, stretch. And hold. And hold. And hold.

What happens when you stretch?

What exactly are you stretching?

Is it your muscle or is it your connective tissue?

Connective tissue, or fascia, as it's also

known, is what holds us together. It is a net that suspends your organs, a high-tech adhesive that holds your cells in place while relaying message between them.

The network is so extensive and ubiquitous that if you were to lose every organ, muscle, bone, nerve, and blood vessel your body would still retain it's shape.

So what happens when you don't stretch? And then when you do stretch how long should you hold it?

These questions led to a decade's long research project into acupuncture and stretch. It started when our guest, Dr. Helene Langevin, of the Harvard Medical School Brigham Women's Hospital questioned why acupuncture needles grab.

What are they grasping?

And how long should the treatment last?

We invited Dr. Langevin to join us for a conversation that matters about stretch.

Conversations That Matter is an Oh Boy Productions program.  
Please help us to continue to produce this program by making a donation at  
[www.conversationthatmatter.tv](http://www.conversationthatmatter.tv)

- [Narrator] Conversations That Matter is a partner program for the Center For Dialogue at Simon Fraser University. The production of this program is made possible thanks to the support of the following and viewers like you.

- Dr. Langevin, welcome to Conversations That Matter.

- Thank you very much.

- I came across your material in researching a introduction that I have to do for you at an event, the Dr. Rogers Prize In Complimentary and Alternative Medicines. We've come a long way when it comes to understanding how our bodies work and respond to treatments that maybe take us outside of the allopathic model. You have focused on the science of stretch. What exactly is the science of stretch?

- We're in the process of finding out really. Stretching is something that we do all the time. Animals stretch, your dog stretches when it gets up in the morning, and yawns and stretches, and babies stretch and people stretch because it feels good to stretch.

- Yes, it does.

- But beyond feeling good what happens when we stretch? We know actually not that much about that. Is it important to stretch? How much? How often should we do it? How long should we stretch for? And then importantly do bad things happen when you don't stretch? If there's a part of your body that your not moving for some reason, either because it hurts to move, or because you can't move it for some reason, either you're in a splint or something, or there are a variety of reasons. Your posture, for example, some people who are in a habit of posture find that they cannot move their body out of that posture because there's been in that posture for so long. So we're really interested in both the effects of stretching and the effects of not stretching.

- When I think of stretching I've always in my entire life thought I'm stretching my muscles. But you say that's not all we're stretching.

- Right.

- It comes down to this connective tissue. Let's first of all define what connective tissue is, and what its role in the body is, and then why it's so important that we stretch that connective tissue.

- Muscles, we start from muscles, because muscles are exactly what you're saying. We think we're stretching our muscles. Muscles are surrounded by an envelope of connective tissue, not only around the muscle but also inside the muscle. Every single little muscle fiber has a little mini envelope of connective tissue around it. So the whole muscle is invested in this multi-dimensional tube of connective

Conversations That Matter is an Oh Boy Productions program.  
Please help us to continue to produce this program by making a donation at  
[www.conversationthatmatter.tv](http://www.conversationthatmatter.tv)

tissue. So that's one thing. But the connective tissue doesn't stop there. It goes between each muscle so it transmits the force from one muscle to the muscle next to it. We used to think that the force that a muscle exerts pulls on the tendon, and that pulls in the bone. That's actually not the case. There's some really elegant recent research that's shown that a large component of the force that a muscle exerts goes laterally to the connective tissue around it, and then to the muscles next door. It's distributed throughout the limb very interestingly. And then the connective tissue doesn't just stop at the musculoskeletal system, which is what I've just described. That's the musculoskeletal type component. It surrounds every single other part of the body including veins, arteries, nerves, lymphatic vessels. Then it goes inside of organs. Your heart, your liver, your lungs, your kidneys. Every single organ of your body has what we call a matrix of connective tissue. It's the scaffold. It's what makes the shape of whatever body part you're looking at. It's a common denominator through the entire body. I find this mind blowing. It's really everywhere.

- As you're describing this I'm thinking it's been invisible to me because I've never heard anybody describe this as being, I want to say like a force field, but it's not entirely, but it is a connective tissue. When I was doing some research about you I was thinking gee, the knee bone really is connected to the hip bone.

- Connected, yeah.

- To everything. What happens without the connective tissue?

- The body would not be held together. It was just be these kind of disconnected organs and things that wouldn't possibly work together. So the thing that's intriguing to me is why have we not seen it so far? Why?

- That's a really good question.

- You dissect your cadaver in medical school. You cut the connective tissue to get to the important things that you're supposed to be looking at, the veins, the heart, the arteries, the whatever. The connective tissue literally was ignored. It was this kind of gray stuff that--

- You just got out of the way.

- You just cut through it. Sadly that's also what happens during surgery. So this connective tissue is literally cut to get to the organs and I have to say that's changing. A lot of surgeons now are paying attention to what they call fascia, which are the layers of connective tissue, trying not to disrupt them too much, because they realize this a new understanding now in surgery that the integrity of the fascial planes is important in the recovery process.

Conversations That Matter is an Oh Boy Productions program.  
Please help us to continue to produce this program by making a donation at  
[www.conversationthatmatter.tv](http://www.conversationthatmatter.tv)

- I've gotta get you to hang on for just a second while we take a quick commercial break. We'll be right back.

- [Narrator] Conversations That Matter is a not-for-profit program made possible thanks to the charitable support of the following and from viewers like you. Please visit [ConversationsThatMatter.tv](http://ConversationsThatMatter.tv) and help us to continue to produce this program.

- As you're talking about this, I have gone in and videotaped open heart surgery, and was completely unaware of the fact that there was this other layer, this connective tissue. I watched them open the skin, cut the sternum, pull the rib cage back. But I'm thinking do I recall seeing this at all? It was as though it was--

- It's hard to see. It's hard to see because it's just this little bit amorphous but when you start paying attention to it you start seeing the layers. The layers are organized. They're not just three dimensional mesh.

- It's not random.

- No, there are organization to it. There's a polarity to it, a directionality to the fibers, and we know they're woven but they're different specific angles that these connective tissue planes take and then they criss-cross. It's very interesting and create these planes where you can stretch in one direction or another, either against the direction of the fibers, or towards them. This whole science is beginning to emerge to understand that.

- You had your introduction to the connective tissue when, as I understand it, you had patients asking whether or not acupuncture might be an alternative therapy for chronic pain. And rather than say, "I don't know anything about acupuncture. "Stay away from it" you decided to go to study acupuncture.

- I was curious.

- But it's not how great discoveries are made.

- I think curiosity is really the number one ingredient in science. You just wonder. And so that's what happened. I took a part-time class just in the evening. It was at the school of acupuncture that was very close to where I was practicing. I took a couple of classes and then they would say you have to insert the needle and then you have to twist and the needle and I kept finding that the needle was, I was feeling something that was happening as I was rotating the needle. I would ask what's this cause. It feels like the tissue was grabbing the needle and manipulating it became more difficult over time, there was more resistance. It was probably like a muscle contracting, but there are places you could insert the needle, like right here at the wrist, there's no muscle at all. And you could still feel that.

Conversations That Matter is an Oh Boy Productions program.

Please help us to continue to produce this program by making a donation at

[www.conversationthatmatter.tv](http://www.conversationthatmatter.tv)

- You'd still get this needle grab?

- Yeah, so that felt like whoa. I didn't understand it. I didn't understand what I was feeling. You know, you go back and you think how many physiological phenomenon are there that you can see and that you can feel with your own hands and that what don't know what they are? I mean, most of these gross physiological things were discovered a hundred years ago. But this was something bizarre, and so figured let's first see if we can measure it. So that's when we starting getting the grant to measure exactly what this force is that we were feeling with our hands, and then that's what led to the rest of the research.

- Where did that research take you, and what have we learned from it?

- Right now we first started wondering what happens exactly when you twist a needle. There was an increase in force. We could record that. Then we say what's causing this increase in force? We did some experiments that showed that it was actually the connective tissue winding around the needle like spaghetti around a fork. It's like twisting and then gradually the needle, the collagen was getting caught, stuck, and then when you would start to move the needle up and down you were essentially pulling on the tissue using the needle.

- So it wasn't gradually? It responds instantly to the intrusion?

- Yes. Right now the first phenomenon is purely biomechanical. There's nothing magical about it. It's just a matter of winding like things around a wench and the more you tighten, the higher the force. Once you've done that, that's just the first piece. Then the acupuncturist starts to do the magic, the art where they pull, they push, they twist, they turn, they lift. And then they're gradually pulling on this tissues and they feel with their hands. It's very, very, I mean, the technique is specific. They're trying to wiggle the tissue around. We think of needles as being like little micro-manipulators. You're essentially applying a very targeted, precise force, very small, but very precise, to a small piece of tissue. But what we found in the lab is that the connective tissue around the needle responds.

- So it's just in that one micro-spot?

- No, it spreads.

- Out over what sort of distance?

- A big distance. We've done these experiments in a mouse and a rat, and what we see is that the response of the cells goes several centimeters. In a mouse it's all the way around the mouse.

Conversations That Matter is an Oh Boy Productions program.  
Please help us to continue to produce this program by making a donation at  
[www.conversationthatmatter.tv](http://www.conversationthatmatter.tv)

- From one needle?

- From one needle. The whole abdomen and back of the mouse from one needle. Now, in a human, of course--

- They're a greater mass.

- The distance, it doesn't, and we don't know in humans because we haven't done this. We haven't been able to look at the cells in humans, because you would need to take a biopsy, and that's too invasive. We don't want to do that.

- Right. So you'd have to be looking at the whole body at the time of the treatment.

- But in an animal it's interesting to see that this response is not purely localized to the needle. There's a more than local affect. It spreads. So we got interested in that. Then that got us interested in connective tissue. Then we thought okay, could you get the same response by simply stretching the tissue, because if the needle is twisting and the tissue is pulling towards the needle, that should be the same thing as stretching.

- It's a stretch.

- So we did that. We took a piece of tissue. We stretched it and we found exactly the same thing. Then we thought it's easier to stretch than to use the needle so in the lab right now we mostly use stretching as opposed to acupuncture.

- This is our second break. We'll be back in a moment.

- [Narrator] Conversations That Matter is a not-for-profit program made possible thanks to the charitable support of the following and from viewers like you. Please visit [ConversationsThatMatter.tv](http://ConversationsThatMatter.tv) and help us to continue to produce this program.

- One of the things that I like about acupuncture is it's reasonably elegant. You've got a small needle that's inserted and you get the stretch. How do you reach in and grab the connective tissue?

- Good question. We do it two ways. One way is we actually take the same piece of tissue that we would have done the acupuncture on. Take it out of the animal, put it in a bath. You can keep it alive. Connective tissue, the nice thing about it, extremely tough. It can stay alive in a bath given the right conditions, bath, liquid, and everything, for hours and hours. So it's very happy. We keep it there. Then we put it in between two grips and we just stretch it. So it's very simple. We just stretch it and we can control the rate of stretch, the amplitude, how far it stretches, how long it stretches. Very controlled, Conversations That Matter is an Oh Boy Productions program. Please help us to continue to produce this program by making a donation at [www.conversationthatmatter.tv](http://www.conversationthatmatter.tv)

very reproducible. Then we see what happens. We can also stretch the whole animal. So we've developed several different methods of stretching, some when the animal is asleep, and then we can actually stretch a piece very passively. But then we have another cool method, which is our preferred method where we do what we call rat yoga or mouse yoga, where we hold the animal very gently by the tail. Then we allow the animal to grab onto something with their front feet, either the bar or the cage, and then they do this amazing thing, which they stretch their whole body. They push their back feet. They do this spontaneously. They push their back feet back, and they hold this pose and they're stretching. They can hold this pose for several minutes. They don't complain. They don't vocalize. They don't indicate that they, in fact they get into it. And then they relax and then you can encourage them. Sometimes we pet them a little bit. And then they stretch. What we find is this has a very profound effect on inflammation. It decreases inflammation when we do that.

- Inflammation is big problem.

- Big problem, yes, yes. So inflammation is related to so many things. Related to chronic musculoskeletal pain. It's related to many different types of inflammatory diseases. It's even related to cancer.

- Bowels, heart.

- Inflammation is across the board. It's one of those systemic problems, it goes across all systems. So understanding how stretching can impact inflammation is important, I think. That's our edge right now that we're looking at.

- So in doing this research have you then basically figured out why acupuncture works?

- Works for what? That's the thing, right? Acupuncture is used for so many different things. Some people use it as an analgesic. That's how the original studies where they said people weren't even having anesthesia or they would do it for a toothache. So you have temporary pain, like you just had a tooth extracted, and somebody will do acupuncture. They'll put a needle on your hand here or something, and then they'll put strong stimulation to it. Either strong manipulation or electrical current or something that really overrides the pain. That's just analgesia. That's very simple, well-known, well understood. It's not specific to acupuncture. It's called neurostimulation analgesic. You can do it a variety of different ways. You can do it just by rubbing your shin really hard. It's a competing sensory input that has to be strong. It has to be almost noxious. But it kills the more noxious pain. There's many other ways to think of acupuncture. Acupuncture is often done, not to do temporary analgesia, but help the tissues heal. If somebody has, for example, osteoarthritis in the knee, or some kind of problem, back pain, neck pain, or something, they'll go to the acupuncturist. The acupuncturist is not trying to deaden your pain right now. They're trying to make your neck better. They're trying to help the neck or the back recover from what happened to it to cause the pain. So they will address things that are more complex. They will start looking at what they call trigger points or tender points. They'll look for places where the connective

Conversations That Matter is an Oh Boy Productions program. Please help us to continue to produce this program by making a donation at

[www.conversationthatmatter.tv](http://www.conversationthatmatter.tv)

tissue or the muscles have become knotted or abnormal, to palpation and then they'll put needles in there. There's more or less understood what the needles are doing, but there's an effort to heal the process. Then, of course, people do acupuncture for all kinds of other things. Allergies, asthma, whatever. There's many different applications to acupuncture, which we understand. Some of them we understand almost nothing scientifically, and some we understand more.

- I've also heard about these energy meridians, or chi. Where does this come into play with the connective tissue? Or are we starting to move into an area that you're not there at yet?

- I find the concept fascinating. I don't know how to ask a research question around that. We don't have the tools to understand what chi is. I mean, it's a metaphysical, almost, concept. Very sort of philosophical. It underlies a lot of traditional Chinese medicine thinking. So for that reason I think it needs to be honored and respected. But I think right now we're not at the level where we can address that. Acupuncture meridians are a different thing, however. Very controversial, and I don't claim to know what a meridian is. But what we did observe is that there's a lot of these meridians when you look at the traditional description in that book and they'll say in the groove between this muscle and that muscle, or in the depression between the bone and the muscle, and that's where you'll find the point or the meridian. Well, that's where connective tissue is. It's where that in between. We were doing ultrasound studies during some of our early, early mechanical studies in humans. We were looking at some of these places where acupuncture points are and we were seeing these little V-shaped things and we were thinking what's that. That was obviously the connective tissue plane between the two muscles. So it's just an observation. It's possible that somewhere along the line there was effort to draw a map to insert to show people where to put the needle to get into this nice juicy connective tissue where also nerves and blood vessels are. So it's not really a mystery, I think, that these are areas that are particularly good targets for something. So that's, I think, these meridians.

- Third and final break, promise. We'll be right back.

- [Narrator] Conversations That Matter is a not-for-profit program made possible thanks to the charitable support of the following and from viewers like you. Please visit [ConversationsThatMatter.tv](http://ConversationsThatMatter.tv) and help us to continue to produce this program.

- I want to come back to the issue of chronic pain, which led you into this. From what you've learned now, what does this bring to people who are challenged with chronic pain? How can they benefit from this as an alternative form of therapy or one that's complimentary to any other sort of treatment they might be receiving?

- Very important question indeed, especially right now where we have this enormous problem with not just pain but also of pain treatment that leads to a lot of times a lot of side effects, including opioid, yes, and so I would say non-opioids, the non-steroidal anti-inflammatories are not totally benign drugs. They  
Conversations That Matter is an Oh Boy Productions program.  
Please help us to continue to produce this program by making a donation at  
[www.conversationthatmatter.tv](http://www.conversationthatmatter.tv)

do have side effects. Not as serious as those of opioids, not as addictive, but there's a whole pharmacological problem, I think, to our current management. We are trying to integrate a medicine I think as a whole is trying to focus on non-pharmacological solutions, or adjuncts, or alternatives, or complimentary treatments. There's a whole spectrum. You don't want to say medicines are bad, or drugs are bad. But let's see if there can be other options for people, especially at all stages of their journey, before they get, maybe preventive, maybe once somebody starts to get pain to try to prevent them having to take strong medicines. But then if they are addicted, try to help them reduce and stop altogether, and then prevent the pain from coming back. To me, that whole thing, I think that these non-pharmacological, including mind-body therapies like meditation, relaxation techniques, extremely important for people. When they're in the throws of having pain, just knowing how to relax can be a huge help. Then movement, moving. People who spend all day at a desk sitting down have back pain. Well, sometimes just moving around, learning what is the kind of movement that I can do safely that's not going to aggravate my pain? A lot of times people who are in pain, they're afraid to move, because they don't want to bend over because it's gonna hurt. They don't bend. They have to learn how to move safely, and then gradually increase their movements. And then, of course, other things like manual therapies, massage, acupuncture, all of these things, there's a big variety of options that can help either in their homes or they see it around. I think this should gradual more openness and curiosity I guess.

- That's wonderful. Thank you very much for coming in and doing this.

- Thank you. It was my pleasure.