

[music]

S1 00:16 I'm very pleased to introduce to you our next speaker, who is the president of The Performing Arts Medical Association, from the Musicians' Clinics of Canada, please welcome, Dr. John Chong. [applause]

S2 00:33 Thank you very much. Greetings from The Great White North, I really miss the snow [laughter]. I come from Toronto. We play a lot of hockey and we do have a lot of concussions there. But I'm going to share with you some of the history of the Musicians' Clinics and also The Performing Arts Medicine Association. It's been around for just over 30 years. It was started by Dr. Alice Brandfonbrener. It's dedicated to the well-being of performing artists - the health of - and we have a wide multidisciplinary group of professionals in our organization and we'd like to grow it. Our website it's artsmed.org, and our journal is Medical Problems of Performing Artists.

S2 01:19 My history began when I was three years old. For some reason, I grew up in a laundry house and my father had some beautiful nannies to look after me and got a piano, and so I started playing the piano. But I got pretty hooked on it, so when I was 12, my dad said, "He's getting pretty good. I think I should buy him a Steinway." So you get a kid with a Steinway, it's sort of like giving testosterone adolescent to a Formula One car, and guess what happened? It didn't take long before I got hurt only on a big pile of Beethoven sonatas and Chopin Etudes, et cetera. So that's how I got into it but I didn't really think about that when I went through engineering and medical school until the Canadian musicians came to me in 1986 when I was a junior professor in occupational health. And at that time they had passed the Canada Health Act, which [guarantees?] universality, accessibility, portability of healthcare in Canada, and since '86 we've been seeing musicians. Back then, I really wasn't sure what I was going to see. I was used to seeing all kinds of injured workers, so I made up this acronym here. If you're good with crossword puzzles, you'll see what it says: Muscle, fatigue, anxiety, depression, nerve entrapment, and various stress syndromes, which is MADNESS.

S2 02:48 But more seriously, science has come on. We do have a really big epidemiological study of 400 professional orchestra players from Australia, and you'll see a long list of risk factors. What is striking is that how common these injuries are, severe enough to impair their playing, and 50, 50 chance of playing hurt, which is a bit astounding when you think about occupational medicine. Excessive muscle tension, long practice, insufficient rest, poor posture, muscle fatigue, sudden increase in playing, repertoire selection, scheduling, stress, lack of fitness, insufficient warm-ups. It sounds pretty familiar to you guys in sports medicine, but in the world of performing arts, it's not as well-accepted.

S2 03:40 A little bit of biological basics. Those of you who play a musical instrument, raise your hand [inaudible]. That's your brain on the left, that's a motor auditory pathway. And if you want to go to law school or accounting, that's your brain on the right - a non-musician. There's structural differences, but what's the whole meaning of music? It's all about dopamine. Why do we play sports? It's about dopamine - we want to win. Well, in music, this is a study looking at dopamine uptake using PET and fMRI - pretty innovative - and you can see those hot dots in the caudate and the nucleus accumbens ventral tegmental areas - the pleasure center. So it is about pleasure, it's not about money. It's about really having a lot of fun, and that's in the audience. So

our goals are really set. We don't have a scoreboard, but in this sense, if we had MRIs and PET scans in the audience, we do have that. So basic laws and their plasticity, what fires together gets wired together. We all know about the homunculus, and that's what we look like, a somatosensory little man - a little monkey I call him. This little guy is going around learning how to play piano and having lots of fun, but making a living is a little bit different. It's a long road to become a pro musician, and we can encounter a lot of resistance, adversity, in childhood education and in the workplace. We have a lot of cortisol production from the adrenal glands, which as you all know, live on top of your kidneys, and we could develop a chronic stress response.

S2 05:30

We now know much more about the mind-body connection, thanks to the Polyvagal Theory, the vagus nerve. What happens to the vagus stays in the vagus. If everything's great, you don't have to worry about it - everything's great. But when we develop a fight or flight, or an immobilization or a depletion syndrome, a lot of things can break down, which are summarized. So why is this so common? Is the question, a lot of amazing research has gone on in the last while. So if you remember that the stress system has no off switch, if you think about it logically, why would we want to turn it off? We want to protect ourselves. So it's a feedforward system, so you can memorize it - what goes up, must come down, spinning wheel got to go round, it's the normal response. When you have too much stress and chronic stress, you have an up, up, and away, so on, okay? It just goes wild. And it's been recently quantified that one year of stress equals six years of biological aging, just like, not won the noble price in 2009, so it's just a matter of time if you let this runaway train eat your tele-meters up, you'll end up in the basement pretty quickly.

S2 06:49

Now, how does this relate to muscles? Well, that's story of adversity that creates a sympathetic tension in your muscles, and then activates spindle cells in your muscles giving pain, it's memorized in the brain and you have this feedforward circuit. Also, the psychological environment is very important because if you think about playing a violin or playing piano, it's not like the hammer or hitting your head playing footballs. But this was an interesting bit of work, that if you do a social stress test and put the students directly into an fMRI scanner, you get the brain lit up, how interesting. So I call this Targeted Humiliating Criticism or THC for short, which is the bad stuff in the Canada and Colorado and places where you have good stuff. So this is bad THC. So there's been no shortage of business from THC or whatever exposure mystically that's in this workplace. We have interventions, A, B, C, D, E, F, G, we're going to work with a volunteer here using the first intervention surface EMG motion video and biofeedback. We have other methodologies, which we can go onto but time is short. So I do have this portable artist psychophysiology and ergonomics lab, which is commonly known as the APE lab, which goes around with me. We'll bring in our subject, all wired up. I think you might remember, who he is? [chuckles]. I'll fire up the computer.

S2 08:29

We'll start the first bit of studies, hopefully, this will work. So we're going to do first, the motion analysis. We have eight motion sensors placed on Dr. Lightfoot. Four axillary and two on each arm, we're connecting it and hopefully, we get contact. Houston come in, come in, [inaudible] [chuckles], it's past Halloween day. Okay, on the left you'll see the top three lines are cervical spine motion and the bottom three are lumbar spine. So if Tim says, yes, we'll see some movement and, no, some rotation, should get some data gong. So I want you to turn towards the screen so you can see what's happening. Try to get out of the way of the camera, so you have a video left lateral, you have view. Let's play a little quick tune, 10 seconds of worth, okay? Just a sec here, we have to-- okay, we should be good, and we will rotate this

guy around. Come back here you, there we go. Beautiful. Let's record. Here we go, [?].

[music]

S2 10:20 Beautiful. It's pretty obvious what the biomechanical issues are there. I'll play it very quickly because our time is precious here. With the biofeedback, you can see the strain on the cervical spine. You spend most of your time looking at your hands practicing. After x number of hours and notes and years go by, we see a lot of cervical spine problems and nerve problems down the arm. So there's a quick example, we'll go back and then we'll see if the muscles work here. Activating hardware. Good. Perfect. Again, having a look. So the top line on the left side is the left upper trapezius, the second line down is your right upper trapezius, the third line down is the left forearm and the fourth line down is the right forearm. And it's quite hard to see, unfortunately, on the bottom the fifth line is the heart rate, which is now sitting at 100 beats per minute, which is not bad for you, Timmy. Cool. It's cool [crosstalk] after all this--

S3 11:51 [inaudible].

S2 11:52 Yeah, and we don't want to measure mine right now [chuckles]. You may want to think about all the cervical flexion. I know that you want to look at yourself and do your own self-diagnosis with the biofeedback and make a correction, because if you keep firing your traps, you're going to get fatigued much quicker than otherwise. Very good.

[music]

S2 12:18 So what do you think? Better? Okay. So let's play it again.
You can try to keep the trap tension way down, where you go.

[music]

S2 12:49 Okay. Good and thank you. So I want you to--

S3 13:00 [To reflex?].

S2 13:00 Let's just figure out. We're playing it back now. I can sort of hear the sound. I can see a lot of activity on the right trap and less on the left, and a lot of activities on both sides. What correction do you think you could pull off because we only have one and a half minute.

S4 13:25 My wife always says that when I play I look like I'm hunching my shoulders, so I've got to relax my shoulders.

S2 13:29 Okay, so let's do it by watching.

[music]

S3 13:35 [?].

S2 13:42 I guess the problem there is you should obey your wife.

S4 13:44 That's right.

S2 13:47 [laughter] She's right, we don't need this, all the stuff. Let's do a little body mapping, relax all your feet, knees, hips. Okay, hear the water coming in from the ocean [laughter].

S2 14:03 Breathe. Relax your shoulders. There, that's better, okay? So forcing yourself to

correct often doesn't work, so we have to create an image, where you're relaxed. Now, the goal is to create dopamine in the brains of your audience, not to be worried about what they're thinking. They're not thinking about this stuff. Create little blobs of dopamine in their caudate and their pleasure centers, okay? See if you can get that. Keep breathing. Ready? Go.

S4 14:43

[?].

S2 14:43

Yeah.

[music]

S2 15:03

Excellent. Call that one, just add a two on it. Save and view and you'll see a difference, just with a bit of advice. Actually, you'll see that the heart rate changes because you're breathing, okay? That's the heart rate variability but it has a direct effect on muscle tension and activation. So you're seeing releases there that weren't there before, okay? Which gives the muscles a bit of a break, less glycogen more oxygen [inaudible]. You guys know all that stuff. Just a little quick tip like that can go a long way. So if just a few minutes-- five, ten minutes intervention and we might save you some orthopedic neck issues and--

S3 15:54

Later on.

S2 15:55

Yeah, later on. Okay? That was a little demo of some of the interventions we can create very quickly with the new technology. Thanks very much. [applause]

S1 16:11

We have a couple of questions. One of the questions we got from in the auditorium is how applicable is this to the everyday musician?

S2 16:22

Well, good point. The every-day musician has access to this if you're a student at the Glenn Gould School in Toronto [chuckles], which is the elite performance training academy in Canada. If you're a patient of mine, we use some of this technology all the time in treatment for all these injuries. Hopefully, we'll begin to work together and collaborate and share the amazing technology we have, and cross-pollinate with sports and performing arts.

S1 16:54

Well, and that's what I was going to ask. The next question is, so is this the same kind of thing that's applicable to other - not just performing arts - but to other kinds of sports?

S2 17:01

Absolutely. This is fairly universally used in sports medicine, if you're familiar with the technology, as well as in occupational medicine and work analysis. So it's available to be adapted for interesting uses for vocal and dance, and of course each musical instruments.

S1 17:20

Great. Join me in thanking Dr. Chong today. Thanks very much. [applause]

[music]