MIGRAINE WORLD SUMMIT

INTERVIEWS WITH WORLD-LEADING EXPERTS

TRANSCRIPT

PERSISTENT CHRONIC MIGRAINE SYMPTOMS BETWEEN ATTACKS

CHRISTINE LAY, MD, FAHS

Introduction (00:05): One of the things we're sort of putting more thought into now is, "What is going on in between those headache attacks?" Because it's not just the migraine day when you're disabled by head pain and light and sound and feeling unwell; the next day, the headache might be gone, but you still don't feel great. You're still sensitive to sound. You're sensitive to light. So, it's really important to have a good understanding of those, to keep a diary or a calendar of those so that you can see as you begin to make progress. For some patients moving from chronic migraine, you know, 20 days a month, they can get better when they have migraine 20 days a month but the other 10 days are now clear.

Carl Cincinnato (00:41): If you're watching this interview, chances are that you or someone you love has chronic migraine. Having lived with chronic migraine myself, it was personally one of the most difficult, exhausting, and anxiety-producing struggles I've ever endured. I still consider my crawl out of chronic migraine to be one of the most difficult things I've ever done. To help make this journey a little easier, we are joined by Dr. Christine Lay, a professor of neurology and headache specialist who helps people living with chronic migraine every day. Dr. Lay, welcome back to the Migraine World Summit.

Dr. Lay (01:14): Thanks Carl. It's great to be back again.

Carl Cincinnato (01:16): Most people watching have chronic migraine and they've had it for a long time. They know what chronic migraine is, but they're still looking for answers. And we know chronic migraine is defined as having 15 days or more [per month] with migraine, but some people count the number of headache days they have. But what about the other days that might involve nonheadache symptoms such as ... light sensitivity or nausea? Should those be counted?

Dr. Lay (01:39): I think that's a great question. And my immediate answer would be yes, absolutely. And I think we have to look at it from the point that ... while decades ago or centuries ago, migraine was thought of as "just a headache," as the famous phrase has now become — but it is much more than a headache, of course; it's a brain disease. There are a number of different symptoms that go along with that head pain: feeling confused; having trouble finding words; the light, sound, smells bothering you; your clothing bothering you; feeling like you've lost your appetite; frank nausea, even vomiting. So, what I encourage my patients to do is, of course, absolutely to keep track of the headache because that's sort of the first clinical sign that a migraine is underway for many of us. Some people are able to identify other symptoms; but they know when the headache comes, they know they need to do something. So, you must write down those headache days. But I do have patients track other days, as well. And I really want them to make note of crystal-clear days and really, a truly migraine-free day; not just a headache-free day, but a migraine-free day.

Carl Cincinnato (02:42): What happens to the brain when migraine becomes chronic and stays that way for several years?

Dr. Lay (02:48): So, there's a number of different changes that are really beginning to emerge, and science and research has shown us a lot. We now know that there are brain imaging changes that we see. And when you study the brain of individuals with migraine, we definitely see changes in the physiology. So, there may be a clinical manifestation where someone with chronic migraine says, "I have 18 headache days per month. And then I have another three or four days when I'm just not myself. I really don't have a lot of clear headache days." Whereas someone who has episodic migraine will say, "I have six headache days and the rest of the time

of the month, I feel really good." And in those individuals with chronic migraine, we see that there are changes. Their threshold for pain is different. It's easier to trigger attacks. You probably remember for yourself very well that when someone has episodic migraine, they can often identify a trigger and they can say, "Well, I didn't sleep that well and a weather change came in and I had my period. So I understand why I triggered a migraine headache." But when you move into chronic migraine, it's like, "I don't know. I don't think I did anything differently than I did yesterday, but today I have a really bad headache." And so that's because the threshold has changed.

Dr. Lay (03:56): And the brain of someone who has chronic migraine we think is hyperexcitable — it's more excitable than [in] someone who has episodic migraine. And there's some changes in the brain and in the region of a brain — people have heard the word "brain stem" — there's a particular important part of the region of that brain stem called the pons. And it looks like in those individuals who have episodic migraine, there are occasions when that pons is a little bit overactive — there's a little too much activity in there. But when you compare that to someone who has chronic migraine, it looks like that region is chronically hyperactive or chronically overactive. So, we are seeing a lot of changes that really are markers for what the patient is clinically experiencing.

Carl Cincinnato (04:39): Does having chronic migraine for a longer period of time make it harder to break out of chronic migraine?

Dr. Lay (04:45): We do think that the longer you're stuck in chronic migraine, the harder it is to get out of it; but that's also not just the migraine and the pathophysiology, but all the other comorbidities that are going on. We know that certain things are good for you to do when you have migraine, but when you have chronic migraine and you've got a disabling attack 20, 25, 30 days a month, it's really hard to follow those lifestyle changes. So, I do think the longer you're in it, the harder it is to break the cycle, but it doesn't mean we can't break the cycle.

Carl Cincinnato (05:16): Yeah, absolutely. So, like an example of that might be exercise, right? If you're in chronic pain, you have allodynia — which is sort of sensitivity everywhere, touch being painful, for example — it's a lot harder to get out of bed, exercise, try and push yourself when you're in that state.

Dr. Lay (05:33): Absolutely. But we do know that exercise can actually work as a preventive for migraine attacks. And it has to do with a number of brain changes: There are more endorphins available; there's also brain factors that promote neuronal health and when you exercise more, you create more of those factors.

Dr. Lay (05:51): And so, what I've talked to my patients about is, yeah, maybe you can't join a spin class. Maybe you can't get out and run 3 miles. Maybe you can't get out and walk half a mile, but you can probably get up in your home, walk to the kitchen and set a microwave timer or some other timer in the house and move. Move for two or three minutes, whatever you can do. Then you've got the comfort of knowing your furniture's right there if you need to sit down 'cause you don't feel well or you feel dizzy or something else is going on. And then patients will find, over time, they can push themselves a little bit more and a little bit more. And I think it's really important for clinicians and patients to have a really good discussion around this. And I wouldn't take the answer from a clinician who says, "Go exercise more." You really need to sit down and develop a strategy and develop a plan for what works for you.

Carl Cincinnato (06:36): And it seems like the absolute number of people that have chronic migraine isn't necessarily increasing relative to the number of people that have migraine. So, for the people who have chronic migraine, every year, people are going back into episodic. So there is hope. People are doing it.

Dr. Lay (06:54): For sure. We think 3% of people kind of move from episodic to chronic, but we definitely move people back the other way. And the one thing we really don't want people out there who are suffering with migraine and chronic migraine [to do] is to lose hope. Because there's always hope. It's a really exciting time in terms of science. We're understanding more, we're making newer, different, targeted medications. We're understanding more about the importance of things like mindfulness and meditation, whereas many years ago, it might have been thought of as, "Well, that's something that somebody else does, that's not what I'm gonna do." But we really understand now that meditation is critically important.

Carl Cincinnato (07:30): You mentioned before the brain stem and the pons and those being sort of hyperreactive or overreactive in terms of the brain function. Is it true that the brain structure can be altered with chronic pain?

Dr. Lay (07:45): We definitely do see alterations in the structure of the brain, and it's not completely well understood why those happen and what the physiology is to get patients to there. But we do know that you can change it the other way. We don't really fully understand how or why, but we do know that doing all the right things — so, lifestyle factors, nutraceuticals, getting out for a walk, mindfulness, meditation, treating your attacks when they come, getting on top of them early and looking at preventive therapy — all are really important to reverse from chronic migraine to episodic migraine, but also to reverse some of those brain changes.

Carl Cincinnato (08:25): It seems like a recurring theme is just, things that are good for the brain are almost always gonna be good for migraine.

Dr. Lay (08:31): Absolutely. And I talk to patients about that. I have migraine, you have migraine — our brains like routine, and things that aren't necessarily good for us can trigger a migraine attack: so being under too much stress, not managing stress, not drinking enough water, not eating well, having too much to drink, not sleeping well, eating preservatives and additives, not getting out and engaging with nature. The things that aren't good for our brain — it's almost like, in a simplistic way, the brain has this migraine attack that says, "Hey, you know, wait a minute, slow down here. We gotta get back on track here. We've come off track and we need to reset."

Carl Cincinnato (09:07): Now, personally, I've done, like I've tried to tick all those boxes in the past and it didn't budge with my chronic migraine. It was only when I combined all those elements of — the lifestyle, behavioral, nutraceuticals, meditation, relaxation, stress management, plus my treatments — did I start to, sort of, make that crawl out of chronic migraine. What role do you think there is for prevention versus these lifestyle and behavioral factors in chronic migraine?

Dr. Lay (09:35): I think they're critically important. And I talk to my patients about what I call the triangle of treatment. So, if we think about, at one bottom of the triangle is the acute therapy. You have a bad attack; you need to treat it to turn it off. And the other bottom of the triangle is the preventive therapy and they all come together at the top to make this triangle of treatment with lifestyle. But that anchoring piece at the bottom, that preventive piece, is critically

important. You can do absolutely everything right, and I happen to believe that even if you're doing everything right, and you're not on a preventive, we're not gonna make the progress we want at all. Or we might not make the progress we want as fast as we could if we were doing preventive therapy. And it's a hard discussion sometimes because many patients are, "I don't want to take medicine every day and I've tried so many different things and I had so many bad side effects." And this is where the excitement comes in because we have these new targeted therapies.

Dr. Lay (10:26): So, you probably had many different clinicians say, "Well, Carl, I'd like to put you on this drug and I know you don't have depression and it's meant for depression, but it's gonna help your headache," or, "I know you don't have high blood pressure. But believe me, this drug will help." Well, now we can say, "I have a migraine-preventive drug and I'm gonna put you on it." And the discussion has become much more succinct and powerful because we're talking about science and biology to drive clinical change. But it's hard for patients even to accept going on preventive therapy, even if it is, for example, a once-a-month injection at home or an infusion that they come in every three months for, but they have to. I think you really have to. But it's important for them to understand it's not permanent. I sometimes have patients in their 30s or 40s saying, "Oh my gosh, am I gonna be on this for the next 50 years?" No, because we want to sort of reset the brain and get it back to a better place. And then the anchoring foundation is the nutraceuticals and the lifestyle and meditation. That's what anchors it. I don't think you can ever give that up.

Carl Cincinnato (11:26): Yeah, that's exactly what I was about to say is that the perspective I had, especially as I was getting better, was that this was just gonna be a temporary solution to let me break that cycle. And we'll hear a few times about this, this cycle of chronic migraine that can be so notoriously difficult to break. And then what sustains that quality of life and keeps you out of chronic migraine is those lifestyle and behavioral things that are just good for your overall health and longevity. So why not do it if you're getting that benefit as well as the benefit with migraine?

Dr. Lay (11:59): Absolutely. It's good for so many other aspects of our health.

Carl Cincinnato (12:02): I'm thinking, you know, for me, migraine's made me a lot healthier. I would be ... I would have many, many more vices and unhealthy habits if I didn't have migraine. I think that there are some really positive qualities about resilience, about empathy, about flexibility and being agile that come out of that as well.

Dr. Lay (12:23): Absolutely. Those are all great points because yes, we don't want to give people chronic migraine so they can become stronger, more resilient, powerful, insightful, empathetic and being able to pivot, you know. But they are great features and people will find that they are stronger people because of it. Because it is a battle. It really is a battle day-by-day, but that's why it's really important to engage with your provider, number one, but also, let a few people in — let in a couple of coworkers, let them know what's going on, let them understand how burdensome this migraine is. It's not simply a headache.

Carl Cincinnato (13:02): So coming back into, I guess the battlefield where people are still in the midst of chronic migraine: For those that have a high frequency of attacks and that report a whole range of symptoms that start blending together — so things like fogginess, nausea, dizziness, constant sensitivity to light, sound or movement — is this sort of haze of symptoms common for people that have chronic migraine?

Dr. Lay (13:26): I think it's extremely common depending on how often you're having your migraine attacks. But if you have 15 days of headache a month, even the minimum chronic migraine — and we understand that a migraine attack could go on for 72 hours untreated — sooner or later, those every-other-day headaches are blending into each other. And maybe it's the beginning of one, the middle of one, the end of another one. And you don't necessarily fully recover in between and you've got those interictal symptoms going on. And so, one of the things we're sort of putting more thought into now is, "What is going on in between those headache attacks?" Because it's not just the migraine day when you're disabled by head pain and light and sound and feeling unwell; the next day, the headache might be gone, but you still don't feel great. You're still sensitive to sound. You're sensitive to light.

Dr. Lay (14:12): So, it's really important to have a good understanding of those, to keep a diary or a calendar of those, so that you can see as you begin to make progress. For some patients moving from chronic migraine, you know, 20 days a month, they can get better when they have migraine 20 days a month but the other 10 days are now clear. And even though the frequency of the actual migraine attack looks to be the same, those other in-between days have improved. And that's when we spoke earlier, I think it's important to keep track of them and not, sort of, "Oh, well, I don't have a headache. So I guess I don't have a migraine." I think they probably do have migraine. They've got leftover lingering postdrome, you know, interictal, postdrome symptoms.

Carl Cincinnato (14:54): And you can have multiple types of headache, right? If you have chronic migraine, it doesn't mean that you don't have tension-type headaches or other things that feel like they're in between a tension-type headache and ... a migraine attack.

Dr. Lay (15:06): For sure. Some patients will say, "Oh, I had 15 days of migraine." And, well, what about the other days? "Well, they were just mild headaches." Well, what were they like? "Well, you know, little bit of throbbing, I guess." Did light or sound bother you? "Well, not like when I have a migraine." How was your appetite? "Well, it wasn't great, but not like when I have a migraine." So, everything is just kind of a scaled-down migraine. And I think if you really have a look at a migraine patient, there are some intermixing ... it may be a pure tension-type headache where they really don't have any associated migraine features. But I think if you really get patients to be honest with themselves — and how are you really feeling? — there's usually a little bit of a migraine feature with some of those headaches.

Dr. Lay (15:47): And it's really just a dial-down between, you know, mild, moderate, severe. And I think ... in our practice, we use that traffic light system. So, a red-level headache is a "stop headache": "I was home. I was not well. I didn't make it to work. I didn't make it to a family event." "Yellow-level headache" is: "I had to slow down," just as if you're at the traffic light, and, "I got through some of my day, but it was a struggle." And then the "green day" was, "I kept going; it wasn't that bad." And so, I think it's important to keep track of those headache days because they will help us manage.

Dr. Lay (16:17): For example, some people may take their acute therapy at the yellow day, but maybe they should have taken it a few hours before, or the day before when it was a green to see if we could knock it out. For other individuals, if they treat at their green, they're taking a medication every day, and they're gonna get stuck in medication overuse headache. Maybe they can get through the green days but treat when it becomes a yellow day. So, it's ... as you know, there's no one-size-fits-all. There's no cookie-cutter approach here; it's very individualistic. And

that's one of the nice aspects of headache medicine. There's a lot of art in it and getting a really good history from the patient and figuring out what plan might work best for them.

Carl Cincinnato (16:56): So, in the same individual, you can have differing severity of migraine attacks and it may even look like it's a tension — may even feel like it's a tension headache — but if you've got some level of nausea or maybe some light sensitivity, it's probably migraine?

Dr. Lay (17:10): I think so. I mean, that's how I would define it. So yes, a tension headache can have a little bit of nausea or perhaps a little bit of light sensitivity, but for the most part, we really think of it as a featureless headache. And often individuals who have an occasional tension headache maybe take a cup of tea, a cup of coffee; maybe they take an over-the-counter medicine, maybe they do nothing — and it goes away.

Dr. Lay (17:33): But an individual who's got chronic migraine, and then on one of those days, they don't feel like they're having the full-blown migraine attack — it's just a low-grade headache: the light bothers them, they're sort of plowing through their day, trying to get better. To me, I see that more as sort of the leftover migraine; we didn't turn that migraine off. And I think it's hard for some patients, but I do encourage them to ... treat early, and if the medication needs to be repeated in two hours, think about what's going on in two hours. You can't just say, "Oh, I'm much better," or, "The headache is so much better." If that migraine's not gone, you need to think about treating again to turn it off. So even at the two-hour mark, if an individual says, "Well, you know, I didn't really have much headache, but the light was bothering me, the sound. I had trouble dealing with my family. I really didn't feel up to, you know, sitting down at the table and having a meal with them" — to my mind that migraine is not gone.

Carl Cincinnato (18:27): So, you mentioned "interictal" before, which refers to the symptoms in between migraine attacks. That's been something that's been a recurring theme from a lot of people in our community. And one of them, Kathy, said her visual symptoms go on for weeks at a time. Is this possible? And why might that be happening?

Dr. Lay (18:47): Well, I think we have to talk to people and find out what is really going on. But there are individuals, for example, who will say, "In between my full-blown attack my vision seemed off. It seemed a bit blurry or things weren't quite in focus," or, "I felt like I was a little bit off-balance. You know, like my head was swirling inside." And those are real features, because remember: We go back to the fact that migraine is not a headache. Migraine is a brain disease, and it impacts many different aspects of our brain and how we function. And so, an individual whose head pain is gone, still can have lingering symptoms in between. And I think for individuals like the person who posed that question, it really steps back to, "OK, am I doing all the things I can do from my own perspective? And you know what, maybe I need to talk to my primary care physician or my neurologist or headache specialist to say, you know what, yes, I'm having fewer migraine attacks, but I'm not great on my nonheadache days." And look at adding in another therapy or changing therapy or bumping up some of the nutraceutical therapies.

Carl Cincinnato (19:53): Vicki wants to know: Where do you start when you have daily migraine and symptoms that are 24/7?

Dr. Lay (19:58): So, I think that one of the best places to start is with a calendar, not a headache diary where you're writing down things, 'cause you'll just, you'll lose hope. If you're writing down, "This came on, I was out, it was raining, or I ate this or ate that" — maybe that comes down road. But in the beginning, it's just, "Did I have a good day or not?" And really get a sense

of, "You know what, I had not great days. I had a terrible day. I had an OK day" — even if you don't have any headache-free days — and get a sense of what that looks like. And then sort of piece it out and say, "OK, what's going on here? I've been on this preventive therapy for three years and I thought it was helping me, but it's not really helping me. And I really don't want to go higher on that dose." And maybe you failed two oral therapies — or as we like to say now, that the medication failed you; because migraine patients certainly aren't quitters, they don't give up.

Dr. Lay (20:44): So, if the medications haven't worked for you — perhaps the oral medications — it's time to maybe talk to your practitioner about looking at the targeted therapies, which we think do provide patients with better, more headache-free or clear days. Or you look at injectable therapy, for example, with onabotulinumtoxinA. And then also looking at lifestyle things. You know, caffeine is often overlooked. And people say, "Well, I only have two or three cups of coffee a day. All my friends do that, what's the big deal?" But you really have to look at the popular coffee chains in your area and get a sense of how much caffeine is in [those drinks]. Because some of them, in a medium size, contain the same amount of caffeine as nine cans of a soda pop product. Well, nobody would drink nine cans and expect to sleep well. Well, you really need to look at how much caffeine is in your coffee, because again, that interrupts sleep.

Dr. Lay (21:36): And my bias as a clinician is that when things aren't going well, we really have to look at sleep and what's maybe impacting sleep. Are you someone who's on your phone right before you go to bed? Are you on your tablet watching a really scary show, or a really interesting show? Do you have any downtime? Do you have any quality quiet time? A lot of people find benefit with gratitude journals. Other individuals have found benefit [with] just what I like to call "brain dumping": just before you get into bed — you know, with a pen and a paper, not on your phone — write out what you're thinking: "Oh, we're out of peanut butter. I've got that meeting tomorrow. I'm supposed to pick up this on Saturday." And just get those thoughts out of your head so that when you get into bed, you can have good quality sleep. So, the person who wrote in the question is just, constantly in headache — maybe they need to look at sleep and pick one thing to really work on.

Carl Cincinnato (22:28): Do you ever treat someone like they have status migraine when they've got that sort of constant attack, to try and break the first attack and then work on prevention afterwards? Or is it more of a just, layering approach of different treatments and therapies?

Dr. Lay (22:45): I think it depends on the number of headache attacks, but for the most part, I would say someone who's in chronic migraine, I would maybe layer things together. But I think you also have to think about, well, you know, do we have the right diagnosis? "I've tried all these different therapies and I'm really not getting where I need to go." Sometimes medication overuse headache muddies the water. So, in individuals who have a lot of headache and take a lot of over-the-counter or prescription medicine and they're stuck in medication overuse headache, it could be a different kind of headache that's underlying that. So sometimes individuals have a constant 24/7 headache with superimposed attacks of intense, sharp throbbing pain. Maybe they have a little bit of a watery eye, but they haven't really thought about it. Or they feel like something's stuck in their eye like sand or grit or an eyelash. And when you treat the medication overuse headache, you're like, "Wow, you don't have migraine. You have hemicrania continua."

Dr. Lay (23:35): So, we have to be sure that we've got the right diagnosis before you're trying, you know, medicine after medicine after medicine. But for a brand-new start, I think we have to look at preventative being key, along with, in my preference, bridge therapy and acute therapy.

Carl Cincinnato (23:52): Do you have many patients that come in, like Merrill and Peggy from our community, who ask: "How do you find the difference between taking a medication early to treat an attack, but avoiding medication overuse headache?"

Dr. Lay (24:05): I'd say it's a huge problem for so many patients. It's a lot easier if you have six or seven or eight headaches a month and you can say, "Well, here it comes. I better take it." But if you have 20 or 25 headache days per month, then you're gonna get into trouble. And so, individuals will wait to see how bad it's gonna get. And they wait to see how bad it's gonna get, and before you know it, it's too late and whatever they take doesn't work very well. And now they're really stuck. So, it really is a very fine line. And sometimes that's where we found that traffic light system to make it a little bit easier. So, think it's, "OK, green is, I can go, I can function. I can do what I need to do. Even though I have a headache, maybe I'm not treating it right now."

Dr. Lay (24:49): But when that green headache moves into the yellow phase where I'm like, "OK, now the light's sort of bothering me. I don't feel as well. I'm worried about that afternoon meeting. Will I be able to get through it?" And then to take your medication, maybe a triptan, at that time. So that you're making a determination about, you know, which kind of [medication] you're going to take. For other individuals, they just have constant yellow headache. And they're like, "I can't figure [it] out; I need a triptan every single day." And then we have to back up and say: "OK, what's going on with our preventive therapies? Do we need to add something in, do we need to change? Do we add an injectable therapy to the oral therapy? Or do we need to change from your injectable therapy to a combination of oral therapy?"

Dr. Lay (25:32): So, you really have to push the preventive part because if you're having so much headache, you can only do so much on your own, being sort of mindful of when to take it and what not to take and not to overuse it. And I think you often end up doing more harm than good if you're a patient who says, "I don't want to take any preventive; I'll just tough it out. I'll just tough it out. And I'll wait and take my triptan when I'm at a red headache and I'm, you know, in bed and sick." But you're just increasing the burden and you're increasing your disability and we don't think it's good for your brain.

Carl Cincinnato (26:06): You mentioned earlier about getting the diagnosis right. What other conditions present or appear to be like chronic migraine?

Dr. Lay (26:14): I think commonly we do see patients, they come in, or they maybe have been referred for a chronic tension-type headache or sinus headache because they have a lot of pain over the sinus region. So sometimes the misdiagnosis is as straightforward as that. It's not tension, it's not sinus — it's migraine.

Dr. Lay (26:32): But one of the other ones, you know — we alluded to the medication overuse headache, because sometimes when you're stuck in medication overuse headache, you lose some of those migraine features or the predictability isn't the same. You might say, "Well, gee, I have a headache, you know, 22 days a month, but I only have two migraine attacks." Doesn't really make sense, but when you peel it back and say, well, this person is popping four or five

over-the-counter medicines every morning to get through their day and to prevent a bad migraine. So, the medication overuse headache can muddy the water.

Dr. Lay (27:01): Things like hemicrania continua, or even some syndromes related to high-pressure headache, or low-pressure headache. We often see people come in who turn out to have a CSF leak. And they've been treated for years as a chronic migraine problem because the CSF leak patient wants to lie down. And when they lie down, they feel better, and people in medicine are talking, "Oh yeah, so migraine people want to lie down. So, this must be migraine."

Carl Cincinnato (27:28): Are there things like new daily persistent headache or idiopathic intracranial headache that people should be aware of? And what kind of symptoms might stand out that differentiate that from migraine?

Dr. Lay (27:41): So new daily persistent headache is, most of the time, an individual will remember: "I woke up on March 5th and I had a headache and it just never went away." Someone who has high-pressure headache, or even for low-pressure headache — we can talk about both of those. So, [with] high-pressure headache, that individual may find that they have transient difficulty with their vision. So even perhaps if they're exercising or they're straining or lifting, they have these periods of time where almost like a camera flash went off and they have trouble seeing their vision. And they could have a headache that's migraine-like; it can be hard to differentiate sometimes. As neurologists and physicians, we look in the back of the eye and make sure there isn't a sign of an increased pressure on the eye, and it's important sometimes to get the ophthalmologist or eye specialist to have a look because they can dilate the pupil and get a really good look in there. Those individuals might also say, "I have this whooshing sound in my head. It's just like a whoosh, whoosh sound that's going." And that could be another marker that this may be a high-pressure headache.

Dr. Lay (28:41): [With] the low-pressure headache, people tend to want to lie down. And sometimes the more they're upright, the more the headache gets worse, but also, they sort of begin to recruit other neurologic symptoms. So sometimes these patients will say, "I have this sense of double vision, particularly when I look way over to the side." And that's perhaps because the sixth cranial nerve is being impacted. Other individuals will say, "It feels like my hearing is echoed, or I feel like there's water my head. And I have these unusual sounds." And those individuals, at least early on in the course of it, will say, "But when I lie down, 15, 20 minutes later, I feel almost back to normal. And when I first wake up in the morning, I don't have any headache, but the minute I get up and out of bed and I'm upright, then the headache comes back." So, all these little subtleties that patients have to make note of and then present that information to their doctor.

Carl Cincinnato (29:32): Where can people learn more about you and the work you're doing?

Dr. Lay (29:36): Well, I'm based at the University of Toronto, and I'm also involved with the American Headache Society, and American Migraine Foundation, and the Canadian Headache Society. So, any of those websites will probably provide some information in terms of what we're up to and the kind of research that we're doing.

Carl Cincinnato (29:51): Are there any final thoughts you'd like to leave with the audience?

Dr. Lay (29:55): I think to never lose hope and this is a time when things are changing. And, you know, you have to get the right diagnosis; that's the first and foremost piece. Still, a lot of

migraine is missed, but once you've got the diagnosis, be an advocate for yourself. And I really do believe that we're gonna be able to help the majority of patients with migraine with all these new therapies.

Carl Cincinnato (30:16): Dr. Lay, it was an absolute pleasure to speak to you again on the Migraine World Summit.

Dr. Lay (30:20): Thanks so much. Take care, Carl.