INTERVIEW TRANSCRIPT

DISCUSSIONS WITH WORLD-LEADING EXPERTS

Why Neck Pain Matters in Migraine — And What to Do About It

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Introduction (00:05): Neck pain is one of the most common and troubling symptoms linked to migraine. Between 7 and 9 out of 10 people with migraine or headache experience it. Research also shows that if you have neck pain, you're more likely to suffer from migraine or tension-type headache. To help us unpack this interconnection, we're joined by Zhiqi Liang, a specialist musculoskeletal physiotherapist and lecturer at the University of Queensland.

Introduction (cont.) (00:27): With over 15 years of clinical and research experience, including award-winning work on neck pain and headache, Dr. Liang is one of the world's leading experts in the field. Today, she'll share what's really happening in the neck and how that knowledge can shape safer, more effective treatment. Dr. Liang, welcome to the Migraine World Summit.

Dr. Liang (00:46): Thank you very much for having me, Carl.

Carl Cincinnato (00:49): Neck pain is one of the most common complaints in people with migraine. To start off, does neck pain cause migraine, or does migraine cause neck pain, or is it both?

Dr. Liang (01:00): That's a great question, Carl, and the simple answer is that it's both. But I would like to clarify that a little bit. So neck pain doesn't cause migraine. It may be one of the triggers that can contribute to the onset of a migraine attack, but strictly speaking it's not a cause. But what many people don't realize is that migraine can actually cause neck pain.

Dr. Liang (01:23): And what we've basically found in our research is that there are quite a few people who have neck pain but have nothing wrong with their necks, which means that the neck pain is entirely part of the migraine — one of the migraine symptoms.

Carl Cincinnato (01:36): So how can patients and doctors tell whether neck pain is a symptom of migraine or if there's a separate neck problem that might be triggering headache?

Dr. Liang (01:45): This is extremely challenging, and it's basically what my PhD research was all about. And basically what we found is that people with problems in their neck that's actually causing neck pain present very similarly to people who have got nothing wrong with their neck and the neck pain is entirely from their migraine. And really the only way we can be certain is to do a very comprehensive physical assessment of the neck function.

Dr. Liang (02:10): So looking at how well the neck moves, how well the neck muscles function, whether there's any stiffness, weakness, to be very certain that they have overall musculoskeletal dysfunction that's similar to your typical neck strain or your typical musculoskeletal neck disorder.

Dr. Liang (02:31): And what we found is that by doing that, you can identify whether someone looks exactly like the person who strained their neck and has got a musculoskeletal condition of the neck, or, no, overall the function is good, which means then that there's nothing wrong with the neck and the neck pain is actually part of migraine.

Carl Cincinnato (02:50): What is a cervicogenic headache and how is it different from migraine?

Dr. Liang (02:54): So a cervicogenic headache is basically a referred headache, meaning that the headache is actually stemming from something else. And in this case, cervical structures. So basically, you've got a musculoskeletal strain or injury in the neck, typically in the upper cervical spine — so C1 to C3. And from there, the pain is experienced in the head. So the pain is referred from the neck into the head. And typically, musculoskeletal treatments that address the impairments of the neck will resolve this headache.

Carl Cincinnato (03:27): Can you define musculoskeletal for us?

Dr. Liang (03:31): Yeah. So if you think about straining your neck, or spraining your ankle, if you sprain your ankle or you went for a run, and you don't usually do a run, and you injured your knee because you've done too much running, same thing in the neck. So your neck has got joints and muscles just like you do in your leg. And if you, say, did something unusual, like sat in an awkward position for longer than you should have, or you did something in a gym.

Dr. Liang (03:55): So if you put mechanical stresses to these muscles and joints, then you create a strain and we call that a musculoskeletal injury. And that's basically the musculoskeletal disorder that we're referring to.

Carl Cincinnato (04:09): So we're talking about cervicogenic headache. What is occipital neuralgia? And how is that different from migraine and cervicogenic headache?

Dr. Liang (04:19): So the occipital neuralgia is quite different because neuralgia refers to nerves, right? So it's basically the occipital nerve that's getting irritated and the pain is actually stemming primarily from the nerves themselves. And typically this is felt when you palpate the occipital nerves, and it's in the distribution of occipital nerves, which is posterior, at the back of your head. So this can coexist with cervicogenic headache, but it doesn't always coexist.

Carl Cincinnato (04:50): Do they often get misdiagnosed?

Dr. Liang (04:52): I think there are definitely people out there. I mean, in our research, we interviewed lots of people with migraine and neck pain, and we found that a lot of people don't quite understand whether the neck is contributing to the migraine, or whether there's something more in the neck that they should get treatment for or not. And of course, some people have both.

Dr. Liang (05:12): They have something in the neck that might be contributing in some part to the migraine, and then the neck pain is also caused by and contributed to from the migraine itself. So it's actually very tricky for people to work out themselves. And then there's been some research in Italy some time ago, which also showed that a lot of people with migraine were actually presenting to primary care clinicians, thinking that they actually have a neck-related headache rather than migraine. So they were getting misdiagnosed at the beginning, thinking that they didn't have migraine.

Carl Cincinnato (05:47): So to avoid that misdiagnosis or, I guess, underdiagnosis that might occur as well, that's where it really comes back to that exam that you were talking about — having a thorough exam. Who would be the best position to do that? Is that the GP [general practitioner], or do you need to see someone else?

Dr. Liang (06:02): I think the GP is essential in recognizing whether someone has got migraine or not, because migraine has the typical features of photophobia, phonophobia, nausea, etc. So the diagnosis of migraine is crucial. Of course, if the patient presents to a physiotherapist as the first call, then as first-contact practitioners, we should not miss that this person actually has got migraine.

Dr. Liang (06:28): Finding out whether they've actually got something wrong with the neck — the best profession for this is actually the physical therapist or physiotherapist, because we specialize in musculoskeletal injuries. We are trained in doing a very detailed examination of the cervical spine. So, someone who's got experience in examining patients with headaches, who is also experienced in examining the cervical spine, is the best person.

Dr. Liang (06:57): And it is challenging, because what a lot of people don't realize is that, specifically in migraine especially, the neck can become extremely sensitive because of migraine. Migraine is characterized by sensitivities, right? People get sensitive to light, to sound, to different things. What a lot of people don't realize is the neck also becomes really sensitive because of migraine.

Dr. Liang (07:22): And what this means is that if you do anything to the neck when it's sensitized, it's very likely to be painful. So patients who experience that themselves, when they're about to have a migraine attack and the neck becomes very sensitive because of that onset, prodromal phase of migraine attack, then whatever they do — they might be sitting at work, they might be doing something in the garden, and they start to feel like the neck starts to get very tight, irritable, painful.

Dr. Liang (07:49): And it's actually not that they've strained the neck necessarily, but because the neck is now becoming very sensitive and it's getting irritated by usual activities that they would normally tolerate. Similarly, if these patients then present to physiotherapy when the neck is very sensitive, then if you assess the neck, you've got to be very careful about not provoking symptoms.

Dr. Liang (08:13): Because first of all, when the neck is so irritable, if you provoke symptoms, it could trigger a migraine attack straightaway. And that's really what we want to avoid. And secondly, you get a lot of false positives. Because everything that you do to the neck is likely to be painful, you're likely to think, "Oh, does this person actually have something wrong with the neck?" Because they move and it's painful; I touch it and it's painful.

Dr. Liang (08:36): So you have to be very experienced in trying to recognize whether the function itself is normal, or is it just pain-limited, or is it truly dysfunctional? And that's why using a group of tests, a comprehensive set of tests, is important. And of course, there are times when the neck is too sensitive — then it might be waiting for the neck to be less sensitive before doing the full examination. And of course, I think you might ask, how do you make the neck less sensitive?

Dr. Liang (09:08): And it's addressing the drivers, right? So if the neck is sensitive because of migraine, then we need to improve migraine. And this might be using medication — the appropriate medication. It might be addressing certain modifiable lifestyle factors. And this is what patients tell us as well.

Dr. Liang (09:25): In the patients that do not have musculoskeletal disorder or dysfunction in their neck, a lot report that when their migraine is better managed, using other strategies that have got nothing to do with the neck, then they notice that the neck pain also resolves. It also improves without any neck treatments. So that's a good sign that, if there's nothing wrong with your neck, some people actually do not need neck treatments.

Carl Cincinnato (09:54): That's really interesting. I mean, going back to the description you gave about how you might be experiencing the prodrome of a migraine attack — so the early phase of a migraine attack — and then all of a sudden your neck is getting tight, it's getting irritable, and it feels like it's sore, like you might have strained it, when actually it's just part of the migraine. And that's how migraine is being expressed in your particular — in your body.

Dr. Liang (10:15): And that's such a crucial window, because if patients understand that, well, that's the time to take action, right? Because we all know that acute migraine medications work best when taken early, at the onset of migraine, and not when it's late.

Dr. Liang (10:29): And when part of our research was interviews, qualitative research, looking at what patients thought, and people were telling us that because they don't understand what's going on, they think that, "Oh, I've strained my neck, and that's why I've got a migraine attack." So they're misattributing the cause with the effects.

Dr. Liang (10:48): And so, if you do a good examination of the neck, and you help them realize there's nothing wrong with their neck — which means that every time they're experiencing this prodromal symptom of neck pain is when they should start recognizing it and using it as an indicator that the migraine attack is probably on its way, and they should just take steps — then they can often manage their migraine a lot better.

Carl Cincinnato (11:12): Before we jump into the mechanisms and causes of neck pain and migraine, can we define neurophysiological?

Dr. Liang (11:19): Ah, neurophysiological. So neuro, neurological, physiological effects. So are you talking about the neurophysiological mechanisms of neck pain?

Carl Cincinnato (11:30): That's right. That's going to be my next question — what are the neurophysiological and musculoskeletal mechanisms that underlie neck pain in migraine?

Dr. Liang (11:40): OK, so the neurophysiological mechanisms of neck pain, put simply, will be the mechanisms related to migraine itself. So it will be the referred pain, the neurological aspects of the migraine being activated within the neuronal networks within the brain, and the physiological effects of things changing, and that is what's causing the referral pain into the neck. So that's the migraine aspect of migraine-referred neck pain, to put it simply.

Dr. Liang (12:17): Then the musculoskeletal effects or mechanisms of neck pain will be basically the local cervical musculoskeletal structures being injured or strained, and that's what's producing the nociception — or what people typically term the painful inputs into the brain — that produces that sensation of neck pain or neck discomfort.

Dr. Liang (12:44): So in people with migraine, they can have one or the other, or they could have both, and that's challenging to work out because in many people, they probably have both; and so if you treat the neck itself, you're improving the local musculoskeletal mechanisms of neck pain. But if you don't improve migraine, then they might still be having some neck pain that's referred from migraine, and therefore, they need to manage their migraine better.

Carl Cincinnato (13:13): This is a topic that was highly voted upon from our community, and so we have some questions from our community as well that I'd love to share with you. So the first one's from Fatima, and she spoke about having craniocervical instability and also fears about her hypermobility.

Dr. Liang (13:31): So definitely, there is a group of people who do have hypermobility, and this can be … Hypermobility is basically greater than your typical range of movement that other people might have, and in some people, this is in the upper cervical region — like what this individual has described — which means that the upper cervical spine has more movement than perhaps other people do have. And typically, we see this a lot in gymnasts because they have to move in greater ranges than you and I probably do in our daily life. So they definitely have … A lot of them have that kind of hypermobility.

Dr. Liang (14:18): Now, as you know, people like gymnasts or athletes who are hypermobile actually function at a very high level and do not have any symptoms. So this means that the body is capable of dealing with hypermobility if it can adapt to it. So if you think about it, you have muscles as well, which can help you support the hypermobility.

Dr. Liang (14:45): So it doesn't mean that just because you've got hypermobility, you're going to experience pain and disability because of it. Yes, a lot of people do, but there are ways to manage it and to reduce that, and there are ways to retrain the muscles to help support the joint so that you don't get as many symptoms from it.

Carl Cincinnato (15:05): J.M., another one of our community members, asked about skeletal misalignment and how that may be playing a role.

Dr. Liang (15:13): So skeletal misalignment is an interesting one because there's been quite a lot of research that shows that if you took everyone on the street and you image their spine, you're going to

find a group of people with skeletal misalignment for sure. But amongst the group of people with skeletal misalignment, only some of them will actually have symptoms. And you may question, "Oh, but how about the rest? Would they go on to develop symptoms then?" Not necessarily.

Dr. Liang (15:43): So what we do know is that our human bodies deal with imperfections. Just because you've got a skeletal [mis]alignment doesn't necessarily mean that it will create problems for you. But of course, if it is creating problems for you, then there are ways to deal with it. Is this a permanent misalignment, like a scoliosis that's congenital, or is this a functional misalignment?

Dr. Liang (16:08): Meaning you have a habit of positioning yourself a certain way, in which case you could change that. And if it is a permanent one, like a congenital scoliosis or something similar that is not changeable, then there are ways to manage it, by doing certain exercises to reduce the stiffness and doing some exercises to strengthen the muscles that might be weak to help you maintain a better alignment and to reduce the risk of it worsening.

Dr. Liang (16:38): So yes, skeletal misalignments need to be properly assessed to know whether it is contributing and in what way to your symptoms, and therefore what kind of treatments you need to address them. The key is for the imaging findings to match up with the symptoms. You might have imaging findings on one level, but the symptoms are clearly from a different level.

Dr. Liang (17:02): And this is the truth of it all, that sometimes imaging is limited. For example, if you have a strain on one part of your neck, you may not see that on an MRI [magnetic resonance imaging] scan or X-ray, because it's a strain that doesn't show up on that kind of scan, but it doesn't mean that you haven't strained your neck.

Dr. Liang (17:24): So, both ways are true, and at the end of the day, you mustn't just base the diagnosis on a scan or an image. You have to put the full clinical picture together: Look at the function, look at the movements, look at the symptoms to make sure the clinical picture matches to decide on the best line of treatment.

Carl Cincinnato (17:44): Can you explain the trigeminal-cervical complex and the connection between the nerves in the neck and the trigeminal system and why this makes the neck so relevant in migraine?

Dr. Liang (17:55): Absolutely. So the trigeminal-cervical complex — or some people call it the trigeminal-cervical nucleus — is basically an area in the brain stem, so at the base of the brain, where the nerves converge. So it's a congregation of nerves from your neck, from your head, and your face. So all these nerves that send messages from your neck, face, and head will meet within this complex. And then from there, a second set of nerves send messages up to the rest of your brain.

Dr. Liang (18:29): So if you're thinking about it, it's like two teams, right? The first team is sending messages to this complex, and then the second team sends messages up to the brain. So what then happens is that sometimes the second set of messages getting sent up to the brain gets a bit mixed up. So they're not quite sure whether the messages are solely coming from the neck, or coming from the head or the face, or both. And therefore, you get referred pain.

Dr. Liang (18:56): And we see this in clinical studies where you stimulate the area of the neck or certain components of the neck joints, and then the person experiences pain in the head. And it's because the nerve sending the messages up to the brain, the second set of nerves, is not sure where the messages are coming from. Is it coming from the neck? Is it coming from the head? And vice versa.

Dr. Liang (19:20): So if you have nerves sending nociceptive, or painful messages, from the head or face, and it goes to that complex, and then from there, the message goes up to the brain where the brain is not sure, then it might think that the message is coming from the neck as well. So then you

start to get pain, not just from the head and face, but you also feel it in the neck. So basically, this complex explains why people with migraine can get neck pain that's entirely referred from the migraine. It's got nothing to do with the neck. And also, it explains why people with cervicogenic headache have got nothing wrong in the head or in the brain, that it is entirely cervical strain that's referring pain into the head.

Carl Cincinnato (20:06): I guess it explains why some people with migraine will have a migraine attack that starts and finishes in the neck. And the only reason they know it's a migraine is because it responds to migraine treatments.

Dr. Liang (20:19): Absolutely, absolutely. And that complex is also one of the reasons why the neck becomes so sensitive. So we talk about a referral of pain, but sensitization also gets referred. So a lot of people know that they are sensitive to different stimuli because of migraine; well, the neck also becomes sensitive once the processes start ramping up within the brain. Those processes spread into that trigeminal-cervical complex, which then makes the neck very sensitive as well.

Carl Cincinnato (20:53): Before we jump into treatment options and discussing some of the evidence and safety for those, there's one more community question from Deb, who has degenerative or ruptured cervical discs, and she's worried about how they might be contributing to her neck pain and migraine condition.

Dr. Liang (21:09): I can absolutely understand how this might be very worrying for lots of patients. Imaging is part of the story, and changes in the joints and structures as we age do occur. And yes, sometimes we call them degenerative changes. And again, it's just trying to work out whether these changes are relevant to the symptoms that you're experiencing. And there are many ways to manage them.

Dr. Liang (21:39): One of the typical results or symptoms that people get from having these changes is that they become extremely stiff. So there are ways to manage their stiffness. You may not be able to change the stiffness entirely, but often patients find that if they can do certain exercises or have certain treatments that can improve their mobility by a certain amount, then the symptoms actually reduce greatly.

Dr. Liang (22:05): Similarly, what's associated with those changes, those degenerative or disc changes, is that you might have associated muscle weakness. It's the same with all other musculoskeletal conditions in the body. It's quite typical that if you have a joint problem, the muscles around the joints will also start to behave poorly. So they will become weak, they don't work as well as they should, and they change the way they work. So there are ways to retrain the muscle function.

Dr. Liang (22:35): The great news is that muscles can always be retrained. So again, by retraining the muscles, getting the muscles stronger and working better, and getting the joints to move as best as they can often helps many patients with degenerative changes in the neck manage their symptoms really well.

Carl Cincinnato (22:52): Diving into treatment options now, I'd love to evaluate a couple of different categories of treatments on evidence and safety, starting with medications. What role do you see for standard migraine medications, both preventive and acute, in reducing neck pain symptoms?

Dr. Liang (23:08): So this is not really in my field of expertise, but certainly all patients that come to us as physiotherapists, we definitely ask them whether someone with that expertise, the GP or neurologist, has reviewed their medications because that is the mainstay management. You have to have good pharmacological management and appropriate management from the pharmacological perspective.

Dr. Liang (23:35): Some patients tell you up front that “When I have an acute migraine attack, the best thing for me is to take the acute migraine medication, and that abolishes it immediately.” And then there are patients who clearly experience lots of frequent migraine attacks, and they are in the category of chronic migraine, which really needs preventative medication. And sometimes they are hesitant or they have misconceptions about taking medications.

Dr. Liang (24:08): And so they're not keen to take it or they haven't been advised on taking it. And definitely, that's when we highly recommend that they see a neurologist or a specialized GP with that knowledge to help work them through the correct medication.

Carl Cincinnato (24:23): And part of the reason for that is because sometimes getting an appropriate and effective treatment can solve the neck pain problem before you're going anywhere else.

Dr. Liang (24:31): Absolutely. I've got many examples of this where we ask the patient and they say, “Yeah, once I took the correct preventative medication, my neck pain went [away].” And this is an interesting thing. In my research, we looked at more than 100, 200 neck pain patients now with migraine. And a lot of them, even when they were not having the migraine attack, they were experiencing neck pain.

Dr. Liang (24:54): So they say, “How can there be nothing wrong with my neck? I have neck pain almost every day. I have it so often, even when I'm not having my migraine attack. So how can there be nothing wrong with my neck?” And yet, when we do a full assessment, there is nothing wrong with the neck.

Dr. Liang (25:07): And so our hypothesis is that even when they're not experiencing their full-blown migraine attack, the migraine mechanisms are still working in the background. Just like a lot of migraine patients say that, “I'm always sensitive to light. Even when I'm not having my attack, I always don't like to go out without my sunglasses.” So we know that migraine symptoms are present and can be present at all times, even when you don't have a full migraine attack. And neck pain is one of those.

Dr. Liang (25:36): So in that patient who was so surprised that they had nothing wrong with their neck, they went on the correct preventative medication, which brought down the migraine sensitization and the migraine mechanisms that were working all the time, and the neck pain went away. And then they were convinced that, "Oh, I see what you mean now. It's entirely referred from migraine and there's nothing wrong with my neck." So you're right. Getting on the correct medication is really, really crucial.

Carl Cincinnato (26:02): That's so interesting. I've never heard it explained in that way, but it makes so much sense. And almost like, as you said, you can have between migraine attacks that lingering light sensitivity or that lingering nausea, or that lingering tension headache. For people with referred pain to the neck, it can be neck pain.

Dr. Liang (26:21): Definitely. Patients start to think, “There must be something wrong with my neck. I'm having neck pain so often.” And because the neck is sensitive, the things that you expect will strain the neck, like sitting in front of a computer, doing weights at a gym — things like that will aggravate the neck, which makes you think even more that, “Oh, there must be something wrong with my neck.

Carl Cincinnato (26:42): Just like looking at the sun when you're light sensitive is going to aggravate your light sensitivity. It makes a lot of sense now explained that way. Does that also suggest that lifestyle changes — such as maybe posture or sleep, hydration, ergonomics — can that help with the neck pain in migraine? And is that because it's helping the neck or is it because it's helping migraine, or is it a bit of both?

Dr. Liang (27:05): Oh, that's a great question, Carl. We know that the migraine triggers often have a dose effect response, meaning if you think about your tolerance or your resilience like a bucket, and it fills up with different things — the different triggers that you put into the bucket — and when it hits a certain threshold, it overflows, and bang, you have the migraine attack. So it may not be the one trigger that causes the migraine attack. It could be multiple triggers.

Dr. Liang (27:36): And that's the thing, right? Helping patients understand that, “OK, I know you've tried to address your sleep and it hasn't done much for you. But, you know what? If you address your sleep plus regular nutrition intake, regular hydration, and regular brain breaks or relaxation strategies, if you add a combination of the modifiable lifestyle factors that we know can contribute to migraine, then you might start to see an effect.”

Dr. Liang (28:07): So the challenge for clinicians and patients is often identifying the most relevant factors that patients need to modify. I mean, patients often don't find it very helpful if you just tell them, "Oh, it's sleep; it's stress; it's diet. You just go away and do all this yourself." It's really listening to them, understanding their story and going, "OK, I hear you have a stressful job, but don't we all? And you love your job.

Dr. Liang (28:33): "You actually embrace having that busy, stressful lifestyle. But look, let's see what else we can do to manage things about it. Have you done regular exercise? We know that regular aerobic exercise helps with migraine. It helps manage stress. It helps improve sleep. Are you, when you get busy at work, are you eating enough at the regular times and taking a brain break when you need to?"

Dr. Liang (28:58): So it's listening and finding out what are the key factors that could be driving or filling that bucket for this person, and then what are the ones that they can address best and then take out of the bucket. And for some people, the neck is one of the things that fill the bucket. So you know how we talked just now a lot about people who do not have anything wrong with their necks?

Dr. Liang (29:21): There are some people who do have a musculoskeletal disorder of the neck, and we have to work out how much of this is contributing to migraine. Is it a small thing that fills the bucket or is it a big thing that fills the bucket? And we explain that to the patient and go, "Well, we know it's one of the things. Let's treat your neck. Let's give you some exercises and things to do. Change your posture. Change the ergonomics.

Dr. Liang (29:45): "Let's reduce that musculoskeletal strain to your neck and let's see what happens." And for some patients, it may be a great thing. They might feel like, "Well, I know that if I still do certain things, I'll still get my migraine, but I feel like I'm more tolerant now. My resilience has gone up."

Carl Cincinnato (30:03): Yeah, your threshold's higher.

Dr. Liang (30:05): That's right. And that said, I was just talking to another patient the other day and I asked her, because it's been six months, 12 months down the track now, and she's got fewer migraine attacks. And we've done everything. We've treated her neck. She's identified modifiable lifestyle factors to address. And I asked her, "So what do you think is the reason why you're getting fewer migraine attacks now?" And she said, "You know what? I think it's because I know when to stop.

Dr. Liang (30:32): "I'm pacing myself well. I'm exercising regularly, but I also know when I'm doing too much and I need to stop." So by doing that, the migraine's gone. So, we treated her neck. It probably did help to some extent, but it wasn't a be-all and end-all for sure.

Carl Cincinnato (30:48): Yeah, that's a really good point, kind of understanding your limits. It's hard to do, though, because in the moment, you know you've got more to give and it's migraine that's

acting like a handbrake pulling you back. But we do need to kind of listen to our bodies. And even if we've got the energy to do something and we know it's going to put us at risk, sometimes it's just not worth it.

Carl Cincinnato (31:06): Can exercise alone stave off neck issues from developing? Like is there a certain amount of activity? And I know there are a lot of people watching with chronic migraine, and exercise is very challenging in that setting. But for people who may be lower frequency or who are looking for more reasons to exercise, can that alone help stave off neck issues?

Dr. Liang (31:26): There are two issues here: neck issues and migraine. Let's talk about migraine first because there's good research to show that if you engage in regular aerobic exercise, it can help with migraine. But you're absolutely right, Carl. There are a lot of people who find it very hard to do that. And one of the reasons is that once they exercise, it triggers the migraine. So this is where we need to be very tailored in our exercise prescription.

Dr. Liang (31:52): And patients might find it very hard to do themselves. It's understanding what the exercise threshold is and gradually exposing them to little bits and little bits of regular exercise. And that, yes, you may experience a little bit of aggravation of your migraine — hopefully not too much. If we dosed it correctly to begin with, you might experience a little bit of aggravation, but not the full-blown attack.

Dr. Liang (32:17): And then your body, your brain starts to gradually adapt to increasing amounts of aerobic exercise. Your resilience improves, your tolerance, your thresholds improve. And the thresholds for everything else improve, too.

Dr. Liang (32:31): Now, that said, for some patients, it may be that for them to exercise properly or at the intensity without triggering the migraine, they need to address other lifestyle factors as well, like having better nutrition, better hydration, better sleep, or making sure they're not trying to exercise in bright sunlight. So it's working out what else can be optimized so that they have more tolerance for the exercise.

Dr. Liang (32:57): And it's often chicken and egg — they all feed into each other. Some patients with migraine also have a lot of sleep problems. And poor sleep contributes to migraine. So if they are not sleeping well, they're tired; they don't feel like exercising. But we also know that if you exercise, it helps with your sleep. So it's trying gradually to help people make small changes step by step. So that's one thing.

Dr. Liang (33:26): You asked about how exercise may help neck pain. It's different for everyone. Some people say, "Oh, if I have neck pain, I get out and move around. It makes me feel better." And generally that's the case. If you change your postures, if you move, your joints feel happier. If you think about any joint, like your hand, if it's held like this *[holds hand in a fist*] for a short while, it's fine. If you hold it like this for too long, it's going to feel uncomfortable.

Dr. Liang (33:48): You move it a bit, it feels much better. So generally speaking, any kind of exercise should make the neck feel better. But of course, if you're running like that *[demonstrates neck in running posture]* for half an hour, then your neck's not going to be happy. And same thing, if you're in a gym lifting weights in an unideal neck posture, if that's straining your neck, then that's not going to be great. And for some patients, their neck muscles do not match up to their body muscles.

Dr. Liang (34:13): So their arms can lift the weights really well, but past a certain point, the neck starts to lose control because the neck muscles are getting tired. So then they need to do specific exercises to strengthen the neck to keep up with the rest of the body. So in those situations, they need to seek more help in helping them retrain their neck or look at the way they're doing those exercises.

Carl Cincinnato (34:37): How effective is physical therapy in managing neck pain and migraine?

Dr. Liang (34:41): So we do know that there's research that looks at neck treatments for migraine. And the earlier research only used certain types of neck treatments, like they might have only done some manual therapy to the neck. And we know that when you do that for any condition, the effects may not be the best. And that's the same for migraine. The more recent studies look at a combination of treatments. So they do neck manual therapy, doing some mobilization, manipulation, that type of thing.

Dr. Liang (35:10): But then they also do neck exercises. But they also do a lot of advice and education. And the research shows that if you add on the education, you get better effects. And that makes sense, right? Because we know that some people have got something wrong with their neck; some people don't.

Dr. Liang (35:25): But to date, older research treats everyone the same. Like they give everyone neck treatment. They give everyone education and advice without trying to differentiate out whether these people have got neck problems or not. So in a clinical setting, we, as we discussed just now, we first try to make sure whether someone actually has got a cervical disorder or not. Do they need to improve their neck function or not? If they don't, and we think that the neck pain is predominantly or entirely referred from migraine, we work on the things that improve migraine.

Dr. Liang (36:01): Is medication appropriate? Do they need to see a doctor to get it addressed? Are there any lifestyle modifiable factors that we can address? Physical activity, relaxation, all that kind of thing — we focus on that. Even when there's nothing wrong with the neck, if they still feel like the neck's uncomfortable and sore, maybe they need some strategies to manage that. Specific exercises they can do at home when the neck's particularly sore and sensitive that they can do to relieve the pain. The physio can help with some manual therapy as well. But with the understanding that, hey, at the end of the day, we need to manage your migraine better. Otherwise, your neck pain is not going to get better.

Dr. Liang (36:42): Then in the group of people who actually have something wrong with their neck, then yes, we do have to manage those symptoms by treating the impairments of the cervical spine. But again, with the understanding that once we've done that, is the migraine still contributing to your neck pain? If it is, then of course we still need to recognize that and manage the migraine, otherwise, the neck pain is not going to go away.

Carl Cincinnato (37:07): What role do occipital nerve blocks or trigger point injections play in treating migraine-related pain?

Dr. Liang (37:14): Oh, that's a very interesting question, Carl. I think it's very patient-specific, and you can probably see that in the research where the results are mixed. We all know that not everyone responds to it. And I think it's probably because some people have occipital neuralgia. So if you inject it, of course they feel better. But not everyone has it, or they might have it, but they also have something else. So it might help to some degree. But until you address whatever else is going on in the neck or in the migraine, it may not resolve fully.

Carl Cincinnato (37:49): In which cases would more advanced interventions like radiofrequency ablation be considered?

Dr. Liang (37:56): Well, certainly that could be an option to be considered. But at the end of the day, whether you do those therapeutic interventions or not, you still have to address the underlying problems. So we see that in old musculoskeletal injuries, that if you block out the pain by ablating the nerve, that can help with the pain for a short while. And this might create a wonderful window of

opportunity for you to start doing the right exercises to restore good movement, to restore good muscle function.

Dr. Liang (38:30): But what we also know is that if you block out the nerves and you block out the pain, but you don't restore normal function, and after a while, the nerve grows back, the same problems arise.

Carl Cincinnato (38:43): Chiropractic care is something patients often ask about. What does the evidence say about the safety and effectiveness of chiropractic care for migraine and neck pain?

Dr. Liang (38:52): I don't know if there's been a lot of research that has looked at that. Like I said, the earlier research would have looked at chiropractic or similar type treatments where manipulation, mobilization [is done] to the neck alone, and then seeing whether that has any effects on migraine. Interestingly, they don't look at the neck pain outcomes very much because they were targeting more than migraine, I imagine.

Dr. Liang (39:17): But as I say, with those types of single, unimodal type treatments, if you only do that alone, the overall effects, the research evidence, isn't good. It doesn't seem to show up very well.

Carl Cincinnato (39:34): This came from a community question from J.M. Some chiropractors use gentler techniques like directional nonforce technique or DNFT. Is there any evidence that you're aware of for these approaches?

Dr. Liang (39:46): No, I am not aware. And look, I'm not saying that patients should never seek out these types of manual therapy techniques. I'm sure they do benefit some patients. But like we talked about earlier, Carl, what's really important to remember is that for some patients, their neck is very sensitive. So they might get their migraine attacks triggered. So if you're feeling that you are getting attacks triggered from having those treatments, then those treatments are clearly not suitable for you.

Dr. Liang (40:16): On the other hand, are you going for those treatments to get short-term pain relief for your neck pain? And if that's the case and it is giving you that short-term pain relief, great. I think that's extremely valuable. And I do give my patients that kind of treatment for short-term pain relief as well if that's what they want.

Dr. Liang (40:35): But if you're going there for ultimately long-term management or long-term resolution of your migraine, then you really have to reassess how you're going and look at whether you're really getting those outcomes as you repeat your treatments or not.

Carl Cincinnato (40:53): We know that hypermobility is something that is common amongst people with migraine. What are the risks of cervical manipulation in hypermobile patients?

Dr. Liang (41:02): So in a very skilled practitioner, the risk is very low. And that said, you have to screen for other potential red flags or contributing factors that might put you at higher risk. So if you are at low risk — when we talk about risk, we're talking about a dissection, a blood vessel getting injured and bleeding, basically. But the risk of that is generally low in young, healthy people.

Dr. Liang (41:32): So if you are a low-risk individual to begin with, and it's a skilled practitioner doing it, and they don't do it at the level where you are most hypermobile and where the blood vessels are most at risk, which is in the upper cervical spine, C1-2 region, where the vessels are the most kinked, the most curved and twisted … And so if you stretch them there where they're already very stretched, they are at higher risk.

Dr. Liang (41:57): So a good clinician usually avoids those types of techniques and it will be relatively safe. But that said, if you are not getting your risk factors screened properly and the clinician is not the most skilled, then certainly there are risks.

Dr. Liang (42:15): So you have to be very careful who you go to and why you're going there, because if you're going there for pain relief, there are also other types of manual therapy techniques that are not risky and will not give you that same level of risk.

Carl Cincinnato (42:31): One of our community members, Karen, reported a vertebral — I think I'm pronouncing it right — a vertebral artery dissection and stroke after cervical manipulation. How real is this risk? We don't want to frighten people entirely away from this, but that's got to be something they have to be aware of as a risk, right?

Dr. Liang (42:49): So this is exactly what I was talking about. So the vertebral artery is a small artery that goes inside the vertebra itself. So it's in the neck itself, and with cervical manipulations, that's the highest risk that we're talking about here, that that artery is the one that dissects, meaning it ruptures or it bleeds and that causes a stroke. And so it's a real risk. And like what we we're discussing before, Carl, it's dependent on the individual. Some people are [at] higher risk than others.

Dr. Liang (43:16): You know, if you have a really underlying cardiovascular issue, that puts you at higher risk. So like I say, going to the right clinician and understanding why you're doing this and also accepting your own level of risk. Some people are very risk tolerant, others are not. And if there's the slightest chance of a possibility, don't do it. It just depends on what you're trying to achieve. And like I said, there are other techniques that can produce similar effects that you could also consider.

Carl Cincinnato (43:49): I've been to the chiropractor before I spoke to neurologists about it. Neurologists don't like chiropractors, it seems, because whenever there's a dissection or something goes wrong, like a stroke or the dissection, they go to the neurologist to fix it. So they see all the problems. But when you go to the chiropractor, you have to sign your life away because they tell you these risks in this form before you get treated. And it's pretty confronting. And I think there are, as you say, there's probably a huge spectrum of practitioners within the chiropractic profession.

Dr. Liang (44:22): Oh, and it's not just chiropractors, Carl. I must make it clear here that physios also manipulate people. And of course, amongst physios, as you say, there's a wide range. There are some clinicians who are more experienced than others. And yeah, it's the same problems everywhere, Carl.

Carl Cincinnato (44:39): We need to do our homework. We need to make sure that they're experienced in treating people with migraine. And if you're hypermobile, if you've got other risk factors, definitely let your practitioner know.

Dr. Liang (44:49): Yeah, exactly. Yes.

Carl Cincinnato (44:51): Just before we go to some closing questions, are there any noninvasive neuromodulation devices that might be helpful with migraine-related neck pain?

Dr. Liang (45:02): Neuromodulation, maybe not — not that I'm aware of anyway. But we do know that there's TENS. It's been around for the longest time now. So TENS is transcutaneous electrical [nerve] stimulation. So you put electrodes directly on the skin. But it's probably best done on the neck because of hair, you know, you can't put it on your head. You can put it on your forehead and you can put it on your neck. And it seems to help patients.

Dr. Liang (45:30): I mean, these are easily accessible these days and they're typically very low risk. And it could be a very nice nonpharmacological method of managing symptoms, and helping people self-manage. So it'd be a matter of trying them out. They're fairly low cost as well.

Carl Cincinnato (45:47): For someone experiencing neck pain with migraine, how should they approach their doctor to get the right diagnosis and safe treatment plan?

Dr. Liang (45:55): I think it's getting a referral to see an experienced physiotherapist who is skilled in this way to get a good neck assessment and to have that really good discussion with the clinician, like, "This is what I'm thinking. This is when I get my neck pain. This is what triggers it. And this is when I get my migraine. This is what I think triggers it," and getting help working through, trying to understand their own condition. That often helps a lot.

Carl Cincinnato (46:23): What's the one thing you'd like people to remember about migraine, neck pain, and treatment options?

Dr. Liang (46:28): I think the most important thing to remember is that your neck pain can be coming from your migraine. It can be coming from your neck. It can be one or the other. It could be both. And of course, the treatment is very different if it's coming from one or the other. So, it might be very difficult for you to work it out yourself.

Dr. Liang (46:47): So if you're not sure, you should definitely seek help from an experienced clinician who can examine your neck to find out what's going on so that you get the best targeted treatment that you need.

Carl Cincinnato (46:56): Where can we learn more about what you're doing or follow your work?

Dr. Liang (46:59): I do have ORCID [Open Researcher and Contributor ID] accounts, so you can look up my research papers. I'm still in the process of writing up a few more at the moment. So I'll be interested in sharing more of that research. But feel free to contact me as well. I love hearing people's stories about what they've experienced. Part of my PhD research was interviewing patients and it was really fascinating hearing their experiences and their journey, and that really helps with the research as well.

Carl Cincinnato (47:27): Well, Dr. Liang, thank you so much for joining us on the Migraine World Summit.

Dr. Liang (47:31): Thank you very much for having me.