

327 – Persistent Concussion Syndrome with Nicola Hunt

Steven Bruce

Here we are this evening for another 90 minutes of great CPD. Tonight it's all about concussion. Now I'm well aware that patients don't generally seek our help for concussion. But that doesn't mean that they won't come in with it. And it's always possible we might miss diagnose it. And we'll even more likely to do that if we aren't properly informed. So Nicola Hunt is the lady to help us out with all that. So a second time here. She's a chartered physio and she specialised in neurological and vestibular matters for over 30 years now, she probably won't thank me for saying that. Nicola, great to have you back on the show. Have you been?

Unknown Speaker

I've been good. Thank you. Yes.

Steven Bruce

We've got quite a lot of practical to do this, this time around as well, haven't we, but I was quite, I was quite intrigued by some of the stuff about you that I saw on the website and with the different organisations, you're a member of the fact that you say you're using lots of high technology in presumably assessing concussion? I'm not sure we'll come on to that later. But how is the state of the art with finding out about concussions these days? Because a lot of money must be going into it, thanks to sport.

Nicola Hunt

Absolutely. I mean, it's a very hot topic at the moment. And I think sort of new, the UK certainly aren't leading the field in it. A lot of the information that we're getting is coming over from America and Canada. I am a part of the complete concussions network, which it originates in Canada, but it's actually now worldwide. And so I get a lot of the sort of the, you know, the research and the up to date information from them.

Steven Bruce

You remember something called is it called complete concussion management, Inc?

Unknown Speaker

Yes. CCMI

Steven Bruce
are very American organisations.

Nicola Hunt
Yes, they're based in Canada. And they've rebranded as complete concussions. It's a little bit less of a mouthful now. But yeah, so it was CCMI, complete concussions Management, Inc. And they've got a new logo rebranded when they were now all known as complete concussions, which was off the tongue a little bit better.

Steven Bruce
Yeah, it does, indeed. And of course you do. I'm gonna say market yourself. I mean, you explain to your patients that you are a specialist in concussion and vestibular rehabilitation. I don't know when we get the chance to talk about vestibular rehab was part of what we're doing on the show soon.

Nicola Hunt
Yes, absolutely. So when sort of somebody has a concussion, a lot of the symptoms can be down to sort of the vestibular system as well. It's very common. And there are different reasons why they may have some vestibular systems after concussion. So we're going to go into that, and sort of talk about that a little bit later, when we talk about the sort of the five main theories as to why people continue to have longer term symptoms after a concussion.

Steven Bruce
And of course, that was the the title of the show was actually persistent concussion syndrome, wasn't it? And I suspect that many people, I would certainly be one of those having had concussion a few times myself, I would have been one of those who thought, well, you get it and he's gone in a day or so. And that's it. You don't need to think about it anymore. But we'll we'll come on to that I'm sure. When we when we were on the show last time, I think you were a bit more restricted in what you were allowed to demonstrate. We were going to go a bit further this time, are we? Yes, absolutely.

Nicola Hunt
So I've included quite a lot of practical into today's session, or the bits of practical that we can't do a I couldn't sort of drag a treadmill into the studio. And I will talk through sort of what we actually do in the practical assessment, and what we can demonstrate we will

Steven Bruce
Excellent. Now I've already said as part of the intro that I don't imagine that many osteopaths and chiropractors will be the first point of contact for someone who is suspected of having concussion. Obviously, there are Astilleros inquiries who do pitchside treatment and so on and who support sports teams and so on. But that is still predominantly a physiotherapy field. So I suppose the issue for us is, how likely do you think it is that people will come to us with problems? They won't realise it's concussion, we might not realise it's concussion. But actually, we need to take into account,

Nicola Hunt
I think it's pretty likely, I mean, you've got the same sort of type of mechanism that causes a whiplash type injury, and concussion type injury, you don't have to have an impact to the head to have a concussion. So if we just sort of think about what a concussion is, when we think about how

we define a concussion, it is a mild traumatic brain injury. So it needs to have a force transmitted to the head. But that doesn't have to be through a direct impact to the head, that can be an impact to the body that is transmitted to the head. So you know, that could be a very forceful tackle in rugby, it could be a very tragic accident, and even a fairly low speed sort of rear end shunt causes a whiplash type injury, and can potentially cause concussion as well.

Speaker 1

Just before you go on, just to reassure everybody, that you will get a copy of the slides in PDF format as normal, we'll send them out as an email probably tomorrow. So we will bring them up on the slide on the screen here. You'll sometimes get them full screen, but you will have that aide memoire after the show. As you'd be helpful, possibly

Steven Bruce

we had this slides up on the screen behind us now. Thank you. Yeah. So I, when I looked at the slides earlier on, I thought, That's forgive me. But actually, if that is the definition of cushion concussion is quite vague, isn't it? Because only the first sentence, which is a definition of concussion, which is mild traumatic brain injury, the others are, how it might have happened, rather than what it actually is.

Nicola Hunt

Yes, I mean, a concussion is a functional injury. So imaging will be normal. And that tends to be very often when you go into a&e, they assess you imaging is normal. So CT or MRI is normal. So it's, well, you haven't got anything more severe. It's just a concussion. But actually, a concussion or a mild traumatic brain injury can be quite debilitating.

Steven Bruce

Yeah, I suspect that many people will be surprised that whiplash could also lead to concussion. And because we do tend to think of it as what happens when you get punched, or when you get your hard tackle or heavy fall to the ground, usually a blow to the head.

Nicola Hunt

Yes, yeah, absolutely. It's a bit of a misconception that you need a blow to the head to have a concussion. And quite a lot of concussions will occur through a sort of affair, even a fairly low speed, road traffic collision where somebody is shunted from there, you get that whiplash injury, but the forces are enough to cause a concussion. So we know that a concussion happens at around about 70 G or force or whiplash, 707 to seven zero, yes, 70 G a boss, a whiplash injury will be at 4.5. So anybody who's got a concussion is going to have a whiplash. But when you're seeing these patients that are presenting with a whiplash, then you need to consider the mechanism of injury. Was there enough force there that actually some of these symptoms could be?

Steven Bruce

No, isn't it? I mean, do you have any idea? No, ballpark figures are for how many G's go through the neck or the head in a road traffic collision, obviously depends on the screen.

Nicola Hunt

There is so many variables, but it is quite common to get a concussion from a viewer enchant in a in a very tragic accident, because you've got that sort of acceleration, deceleration and the force being transmitted to the head.

Steven Bruce

And what's the likelihood of those symptoms persisting beyond the what we normally expect that with a day or so.

Nicola Hunt

And so concussion symptoms, you look at the literature, it's quite interesting, if you look at the literature, about 80% of concussion symptoms will have result between seven and 10 days. And brain recovery actually takes a little bit longer than that. So the brain recovery is, you know, anything up to 21 days. But then the literature also says between 10 and 30%, which if you do the maths doesn't quite add up with the 80% will go on to be persistent concussion symptoms. So symptoms that are still present at 28 days or longer. And I see people who've had concussions for months, if not years.

Steven Bruce

Right. And I suspect at some point, you're going to tell us how you work out that it's a concussion and not something else that they're suffering from as well as what you're going to do about it afterwards.

Nicola Hunt

Yes, absolutely. So we go through the sort of the five theories of why it can make be a continuing concussion. And we also look at the neck as well, because we know you know, we've we know that if it's less forceful whiplash than it is for concussion. The concussion is likely to have a whiplash element to it. Yeah.

Steven Bruce

What so this is a bit of a digression. I know there's a chunk in your presentation, your slides about whiplash. But what's the current theory in physiotherapy about treating whiplash?

Nicola Hunt

I'm a New physio. So I'm probably not the best person to do that I would treat the concussion element. So from a concussion point of view, I would focus on cervical proprioception, look at the soft tissue. Look at sort of the preset facet joints, but then anything beyond that, then one of my MSK colleagues would co treat with me.

Steven Bruce

Sure. Okay. But it was an unfair question, because you aren't here to talk about that whiplash at all. You are going to tell us about distinguishing the two. Yes, yeah. Okay, so what's next, so the slides won't go. Maybe they will in a sec. So got the symptoms of concussion.

Nicola Hunt

So symptoms of concussion are very, very variable, you know, and there are so many of them, some of them. Again, there's such an overlap with whiplash. So the ones that are highlighted in yellow, these are the symptoms of concussion or the ones highlighted in yellow you would also see in a whiplash type injury. We might

Steven Bruce

run through those because it could be difficult for people to read these if they're on a small screen or something but so we've got we've got headache, dizziness, difficulty falling asleep, or excessive sleeping, and loss of sleep. So Pretty much anything that changes in your sleep pattern, yes, could be down to either concussion or whiplash, yes. Irritability. I haven't really associated that specifically with whiplash other than that people get grumpy when they've got pain.

Nicola Hunt

Absolutely. So you know, where is the irritability coming from? Is it coming from a more central cause of being not able to inhibit your sort of anger response and sort of not your stop and think sort of, or is it because you're in pain, you've got sleep disturbances, you're a little bit more irritable. And again, that links in with sadness, low mood, because if you're in pain, it's going to affect mood, potentially.

Steven Bruce

So the ones I'm focusing on here are the ones which are overlap with with whiplash, which includes concentration and memory and visual problems and tinnitus. On the far right column there. With the other ones here, I'm looking for confusion. So as we were definitely concentrating, I honestly, this was the first time that I had with the head concussion. I was completely and utterly confused. I had no idea how I had got to where I was, I was in a martial arts competition at the time, and I just been bounced off my head on the mat. Yeah, and it was, it was a very strange experience. And at the time, I didn't I knew something was wrong. I didn't know what because I couldn't think clearly.

Nicola Hunt

Right? Yes. Yeah. And we, you know, we will put that as difficulty remembering, and that's one of the ways that we assess the severity of any brain injury is how much amnesia that is before the event. So can you remember the morning of the event? Can you you know, can you remember right up to the incident that caused the concussion? Or have you lost a few hours? Have you lost a few days? And that gives us a little bit of a sense of how severe the brain injury? And can any

Steven Bruce

of the symptoms persist for beyond 28 days? Or could I have Could somebody in my position, could they remain confused for longer, but it still be just a concussion, just a concussion, which will recover eventually,

Nicola Hunt

if the memory loss is persistent, at then it's more likely to be a more moderate to severe brain injury. And certainly, if somebody was coming in more than sort of a couple of days later, and telling me that they still had no memory of what they were doing day to day at the moment, then that certainly, we will be look, we will be asking for imaging and a neurology review.

Steven Bruce

Right? Okay. Are there any others here that you particularly want to concentrate on?

Nicola Hunt

So we're going to sort of look at what, what causes them as we go through the sort of the persistent symptoms. And you know, fatigue is pretty much there with every concussion, and it's one of the ones that doesn't particularly overlap with whiplash. So it's looking at those that maybe people are coming in with a whiplash, not realising that they've had a concussion because they didn't have an

impact to the head. And that's sort of the misconception around concussion. And if they're saying, you know, they've got some balance issues, they've got significant fatigue, and they've got brain fog or that confusion. And they've got light sensitivity, noise sensitivity, they are more tending to sit in the concussion basket of symptoms, rather than the whiplash basket symptoms,

Steven Bruce

or ask you about numbness, which you've got in the right hand column there. Is there a pattern to that? Because obviously, if there was numbness associated with a cervical injury of some sort, you might freak my following dermatological pattern. But how about in this case?

Nicola Hunt

So you're looking more logical, looking more at sort of emotional numbness, flattening of emotions?

Steven Bruce

Okay. I see withdrawal. So we're not talking about paraesthesia. Sensation has an

Nicola Hunt

easier, right. Okay. That will be very much on the next slide. Yep.

Steven Bruce

Well, the previous one,

Nicola Hunt

there we go. Were you looking at the sort of the symptoms of whiplash? And again, you know, when we're looking at the symptoms of whiplash, then they're sitting more sort of around the neck pathology. So neck pain, neck stiffness, worsening pain with neck movement, loss of range of movement of the neck, tenderness in the neck, shoulders, upper back, and then the paraesthesia that you were talking about the tingling or numbness in the arms. What about

Steven Bruce

memory problems? And so what I mean, I would not have associated that specifically with a with a whiplash injury. How does that occur?

Nicola Hunt

If you're looking at the literature, they do say that they can occur with a whiplash injury, and now it's looking at about sort of the impact of pain and sleep disturbance on use of your cognitive function.

Steven Bruce

Okay, so a lot of this then might be due to pain rather than to any sort of cerebral distance.

Nicola Hunt

Absolutely.

Steven Bruce

Right. And we were on measuring symptoms there is that where we're supposed to race So we haven't had a question about this at the moment Aiden has already come in and said, who's qualified to run players through a scat five categories and sign off on the GR TP, graduate return to play protocols, which means very little to me, but I imagine it means a lot more to you.

Nicola Hunt

Yes. So the question of who can run the scout five, if you're looking at assessing for return to play the scout five isn't sensitive enough. So the sports concussion assessment to or sports concussion screening tool, which is the scout five, is looking at identifying whether there might likely be a concussion. So it will be done pitchside by a suitability for

Steven Bruce

his injury assessment that is just a prominent part of rugby these days? Absolutely.

Nicola Hunt

Yes. So it would be used pitchside to identify whether there is likely to be a concussion. So if you are getting there, it's depends who's been trained up to do it. It can be your sort of pitch side physio, your pitch side sports rehab, you can look at sort of training your coaches to do it. But it's somebody who's got the

Steven Bruce

skill, there is a specific training for it, because the question is who's qualified to do it?

Nicola Hunt

Yes, you would have to be, you would have to be familiar with how to do it. And so have had some training for the accountability sort of to be able to make that decision.

Steven Bruce

Does that training, how long does it take?

Nicola Hunt

And it's usually done in house by sports teams. But then yeah, the Society of Sports Medicine will offer courses on it. It's part of your pitch side emergency first aid qualification, which if you're running pitch side, you should have an emergency. The sad.

Steven Bruce

Is that scout five qualification now always part of pitch side first aid should regardless of the sport,

Nicola Hunt

yes, it should be. Okay. Yes. Because we have the concussion and grassroots sports guidelines that came out earlier this year. And it says that they clearly who you know, who's the responsibility and what the protocol is, it's pitchside assessment. And then with that pitchside assessment, it flags up anything on the scout five, if that's what you're using, then it's for a further assessment by a suitably qualified health professional.

Steven Bruce

And we did talk about Scout five in the last show when you came on, we did. And if I remember, rightly, is not a particularly difficult protocol for a medical professional to work their way through is very familiar with it before you. Go ahead. But I guess if you know the answer to Aiden's question, then I'm inferring from what you've said that if you're doing pitch side stuff, you must have done an emergency first aid course were picked for sport and therefore you will be qualified to do the scout

five. Yes. And I imagine every every sport it, presumably club level has to have a first aid or on duty for

Nicola Hunt

sport. As far as I'm aware, you should have somebody

Steven Bruce

I've never been to a rugby match where they haven't had one. Yes. Okay. I just, there's another one here from Victoria. And I don't know what she says. But so if it's irrelevant at the moment, or leaping ahead of ourselves, bear with me. Victoria says I have bizarrely had two recent patients with persistent concussion syndrome. Are there any guidelines for treatment? I'm guessing we're gonna talk about that. They didn't come to me for that they had other issues. I was a little anxious to manipulate and a little anxious about manipulating the cervicals. So yeah, we're going to we're going to talk about that later on. So rest assured Victoria, we will come back to you. And ambo says, for what duration is the longest time possible for concussion diagnosis? If beyond x term, what would this diagnosis be more likely? Which diagnosis will be more like a long term brain damage? So I think what he's asking is not how long can you wait before you diagnose it, but how long might the concussion persist at the extreme?

Nicola Hunt

I see people for five years post concussion who are still having, but do respond to treatment. Right. Okay. So it's around getting the right treatment in at the right time.

Steven Bruce

So it doesn't mean after a particular time, then it's not a concussion, it's going to be more severe brain damage. Unless it's, as you said, memory loss after persisting beyond a few days. Yes,

Nicola Hunt

yep. So you you have when you're assessing any sort of head injury, you have your red flags. And if the red flags are there, then they are suggestive that it's more than a concussion. And you would need neural neuro imaging imaging of the brain CT or MRI, and neurological,

Steven Bruce

what sort of red flags are we talking about? So red flags would be

Nicola Hunt

persistent loss of consciousness, seizures at the time that persist. If they've got significant amnesia, pre injury or struggling there, increasing confusion and significant sort of balance problems, numbness weakness down one side of their body. So you're looking at sort of things that may sort of add up to sort of something else going on there.

Steven Bruce

Yes, I guess if you start looking at numbness down one side of the body, people are automatically thinking stroke or some sort of ischemic cerebrovascular

Nicola Hunt

bleed. If it's following an impact, then you're thinking bleed.

Steven Bruce

Yeah. And someone knows so is what if the person suffers from migraines as well, because that influenced anything in concussion diagnosis.

Nicola Hunt

And it shouldn't do because you're not just reliant purely on headaches as a diagnosis for concussion. Headaches post concussion will tend to settle. And along with the other symptoms within seven to 10 days for most people, those who go on for persistent symptoms can have ongoing headaches,

Steven Bruce

but you're guessing I mean, in terms of migraine, migraine sufferers tend to know what their headaches feel like, they will probably be able to say to you, this is my normal migraine headache, as opposed to and this is a weird one, I haven't had this before.

Nicola Hunt

Absolutely. And with migraines, you tend to sort of see the trigger. You know, that tends to be something that triggers that. And like you say they know their migraine pattern, and they know what their migraine headache feels like. Yeah,

Steven Bruce

but one more question. I'll let you carry on with your missus trellis of North Wales, otherwise known as Matthew, if you're a radio for fan, you'll get the joke from Is there a particular significance to the symptoms in yellow on the slide, please? Yes. I mean, you said those are the ones that overlap between whiplash and concussion didn't Yes. So yep. So for anyone else missed that. That's why they're in yellow. And I think, I'm not sure that is clear on the handout. So maybe I'll mention that in the email as well, just that people realise why they, yeah, yeah. Okay, let's go back to your presentation.

Nicola Hunt

I'm struggling with this.

Steven Bruce

This is one of those wonderful technological, this is one of the simplest technological devices we have in the studio. And, and yet, sometimes it plays out, let me have a go with what's the next part that we're dealing with.

Nicola Hunt

So we're going to get just

Steven Bruce

in to sort this out, because the clicker is not working, and the slides aren't moving. So we need. So we're

Nicola Hunt

going to talk about sort of how we objectively measure symptoms or as objectively as we can, so we use the persistence concussion. So the concussions start, again, the concussion symptoms, scale

scoring, so that depending again, on the literature, most of them have, it's better to have 22 questions. But going, there is the occasional one that only has 21 questions. And what it does is it

Steven Bruce

should get to use the forwards and back buttons, and if they're not working on either, and

Nicola Hunt

what it does is it identifies the most common 22 symptoms of concussion, and then you score them with not being I don't have that symptom, and six being, that's the most severe that I can ever imagine of that symptom. And you get the patient to score that now that should be done early on after an acute concussion. So that we get an idea where you know, what symptoms people are having. If those early scores are very, very high to their scoring six on most symptoms, then that's a sort of a bit of a warning that this person may go on to develop persistent symptoms. And therefore, what you want to do is make sure that that concussion, you know, it's really well managed, and the psychological support is there early on.

Steven Bruce

Okay. Again, I'm, I'm going to make an assumption that the bulk of this evening's audience will not see acute concussions, because unless they're doing pitch side stuff, or well, yes, they're doing pitch side stuff. It's just not something you'll come across there their agenda. But yes, useful to know, I guess where we want to go is that let's have a look at the persistent symptoms and how they're going to present to us in clinic and how we distinguish between the whiplash. And I know we've looked at the symptoms, but there's going to be a clinical picture isn't going to be the person you see in front of you, and what's going to alert you to the possibility that we've got we're getting anything No. I'm not even getting anyone telling me what's going on with the slides. So.

Nicola Hunt

So yes, absolutely. So you know, you've got your person in front of you. And a lot of it is around the history that they tell you, you know, if it was a fairly high speed, impact or significant impact, so if it was on a rugby pitch, if it was in a boxing arena, if it was a road traffic collision, where they are, you know, having some force coming in, then you it's got to be there in the back of your mind that, you know, is this a pure whiplash? Or is the concussion going on? When we looked at the different symptoms, you know, do they have some of the ones that are more sort of sitting in just the concussion basket, so particularly things like the balance impairment, and the dizziness are more common with concussion than they are with whiplash. You can get psychogenic dizziness so that will sit in both But it's how they explain that dizziness and how they talk about it. What is it that triggers it? That sort of gives you some clues that that's probably there's a concussion element of it, because there's no

Steven Bruce

reason why you can't have both is if you've been in a road traffic accident, and I, and I imagine that side impact is likely to be worse for causing head injuries and possibly neck injuries. There's quite a there's going to be a big overlap in symptoms, because yeah, that's a chance of everyone having some form of whiplash.

Nicola Hunt

Yes. And again, depending on the literature, 60% upwards of people who have a concussion, also have a whiplash, because the force required to cause a concussion will also cause a whiplash in

Steven Bruce

contact with your clicker. Let's give it a go and see what happened.

We're getting some interesting pictures.

Nicola Hunt

So, you know, when do we consider it to be post concussion syndrome or persistent concussion symptoms? And that's really it's the 28 day cutoff. So if people are still having symptoms after 28 days, then we say that it you know, this is no longer an acute concussion. This is post concussion syndrome,

Steven Bruce

by taking these terms are interchangeable post concussion syndrome persistent.

Nicola Hunt

Yes, yes. It depends, again, which literature you read. I have to say that

Steven Bruce

like most things in medicine, it's confusing, isn't it? Because persistent says this is concussion concussion continuing Post says no, there's something different going on to my to my mind.

Nicola Hunt

Yes. So after concussion, you would expect symptoms to resolve within seven to 10 days. However, that doesn't mean that the brain has fully recovered at that point. And brain recovery, sort of the the changes in the energy levels to the brain, the ATP, the energy module, available to the brain takes around 21 days or up to 21 days to get back to normal. So that's why we tend to play shouldn't be in competitive play within 21 days of concussion. But if symptoms are persisting for 28 days or longer, then we would call it PCs and same deviations, but either one,

Steven Bruce

right? Yeah, that's that's helpful. At least ambo has come back in again, to ask, is it possible to identify suitable or appropriate scat five courses or the equivalent, or something more relevant to clinical use? Now, from what you said, scat five isn't really relevant in clinic because it's a bit of an acute pitchside immediate action screening tool? Yes.

Nicola Hunt

So what we're going to talk about is what causes the ongoing symptoms of concussion. So tonight, we're very much focused on the sort of the after the 28 days, the same things apply. But the advice is slightly different in those early days were much more focused on sort of the inflammatory process we know is happening after a concussion. After 28 days, it should have resolved, but sometimes it gets a bit stuck.

Steven Bruce

So to just deal with ambo, who wants to know what training we can have in clinic to make sure we recognise these things, what you're gonna say, this evening will be a good start on that. And what we're really looking at is the clues which mean we refer to someone who can do a much more in

depth diagnosis. And I think Amber will realise once you've seen the sort of kit you're using that maybe this is beyond most of our clinics to be to be definitive.

Nicola Hunt

Yes, I mean, the thing that you absolutely need is a treadmill, which we'll talk about when we talk about the sort of the different testing that we do. The others, you know, I'm a specialist concussion clinic. So I've invested in the equipment that enables me to give a, you know, very objective concussion assessment, it is possible to do it without some of the kit, and I'll talk about some, you know, the alternative ways of assessing, but you do need to have the knowledge, I did the complete concussions management Inc, training, which is now complete concussions, and which is how long, and it's 60 hours over four months, with a exam after each module and an end final exam. And then you have to revalidate every two years. So you have to do a sort of slightly shorter course, which I think is 40 hours, every two years, every two years.

Steven Bruce

frm remember, rightly, it sets you back a bubble to as well,

Nicola Hunt

isn't it? It's an investment.

Steven Bruce

Yeah, so somebody wants to do it, what should they be planning on splashing out in order to do their their course.

Nicola Hunt

So if you want to set up as a practice, you can do the course and set out as a practitioner, whereby you would then have to sort of you would, you would have to have the clinic space, you would have to have a treadmill and be able to follow the sort of evidence based caching assessments that they advocate. And that would be a sort of on the network. So you would then join the network of complete concussion. We have a small network in the UK, we are growing relatively rapidly at the moment. So we're getting quite a lot of interest in that expanding So we have mostly physios from a MSK therapy point of view on it. But we do have some sports medicine doctors involved in it as well. And we have their support of signing off

Steven Bruce

a little bit like Mr. Raj on the Today programme, you're ducking the question of how much the 60 hour course costs, I don't see much more clear on politicians.

Nicola Hunt

I don't know the actual cost of it. And I know that, you know, if you contact me, I can put you in touch with the UK.

Steven Bruce

As part of the email tomorrow, I'll give the link to all these resources, and they want to go down that route they can. But you've got your five main theories on ongoing,

Nicola Hunt

ballpark figures, it's certainly, you know, you're certainly looking at investing four figures into the course. But I couldn't tell you the cost at the moment. So if we look at sort of, you know, going back to the clinical scenario, what causes the ongoing symptoms of concussions, there are five main theories as to why people continue to have symptoms after 28 days, blood flow abnormality is a presentation of an acute concussion, we expect it in the early stages, as the blood flow to the brain is changed because of the impact, because of the chemical reactions going on, where you get the initial impact that causes the sodium potassium chemicals to be versus where they are within the nerves, it opens the calcium channels because of the stretching of the axons, calcium moves in. And then there is a huge amount of energy used. So the ATP on energy molecule in the brain is used to pump all those chemicals back to where they are. So the brain gets very energy depleted, there's inflammation going on there. And that's the bit that takes up to 21 days to get back to its pre injury status.

Steven Bruce

Is that tested for in concussion? Is there a scan that is conducted in order to see whether there's abnormal blood flow? And if there is how will they know is abnormal, because they wouldn't have done a scan before.

Nicola Hunt

So that is now scanning available? It's very rare to have that level of technology. But yes, it is now possible to test for that. What we usually do is a clinical test to look at that which we'll talk about. And then we need to consider metabolic inflammatory or hormonal changes, vision and vestibular dysfunction, cervical spine dysfunction, and the psychological

Steven Bruce

reasons why we're gonna get hormonal changes.

Nicola Hunt

So should we go through from the top. I'm gonna cover that later. I'm gonna cover that. So we'll start from the top blood flow abnormalities. So as I said, we know that in the acute stages, the cerebral blood flow is altered the autonomic system, and the cerebral blood flow changes can persist. And they're one of the things that can give rise to longer term symptoms. So what this may present as is a person who sitting resting has no symptoms, but then they do a mental tasks or they're focusing on something they're concentrating, or they're doing a physical activity or trying to return to sport, they get a flare up or an increase or symptoms reoccur. So what we know is that when you're asking for sort of a change in blood flow to the brain, it's not happening to meet the demand. So we assess it via exercise testing, and it's called the buffalo concussion treadmill test. It's a protocol exercise test that we're looking for, does exercise increased symptoms. So we would take a resting heart rate, we would test take a resting overall symptom score, and then we will put them on the treadmill. It's a brisk walking test where we manipulate the incline of the treadmill. On every minute we're reassessing what their heart rates doing is their symptom score changing, and we measure how hard they feel they're working through the Borg scale of rate of perceived exertion.

Steven Bruce

Borg see I'm not familiar with the Borg scale of rate of perceived exertion. But I imagine it's a standard. Two things I do know about heart rates. And I'm curious as to what you would expect to see because if you make someone work harder, their heart rate will change. How will you? How

would you say this is not a normal change in heart rate? What would what will be the indicator, so we're

Nicola Hunt

less concerned about what's happening with their heart rate? What we want to know is what heart rate does their symptoms increase beyond a small increase? So we have a threshold of a three point increase in symptoms. And what we want to know is what heart rate does that three point increase in symptoms occur that because then what we want to prescribe is a sub symptom threshold of aerobic exercise programme. So what we would then do is we know when the symptoms start to peak, we look at the heart rate, we take a percentage of that heart rate and say, go and train at this heart rate for 30 minutes, five times a week, come back, repeat the test until they can pass the test. Right. Okay. So that would be the sort of the assessment and the treatment clinically on blood flow of morality, because I'm not quite sure how many if any of the superduper scanners are available in the UK, but certainly they're not accessible to the general person. So then you talked about hormone changes. So metabolic inflammation and hormone we've sort of put together in one category as to why symptoms may persist. So we know at the beginning that there's neuro inflammation within the brain. And that inflammation may persist, for reasons not really clear as to why it doesn't resolve like a normal inflammation sort of pathway would. But there are some things that we know that can influence that. And the gut brain axis is one of them. And they're sort of the term that we describe it as leaky gut syndrome. So there is a real connection between the health of the gut and the health of the brain. And there's really music

Steven Bruce

to the ears for an awful lot of our audience this evening, because it's very much certainly was very much part of my training as an osteopath.

Nicola Hunt

Yes, yeah. So we know that, you know, there are certain molecules that shouldn't cross the blood brain barrier. But we also know that with the leaky gut syndrome, molecules are leaking out of the gut into the bloodstream and are able to cross the blood brain barrier. So they're driving that persistent inflammation. So, you know, again, how we influence the gut is through diet, you know, what we put in affects what's going on in inside us. So, again, sort of linking in with sort of functional medicine colleagues with nutrition lists, to get sort of the right advice there.

Steven Bruce

And can I assume that this is now part of standard for in this country NHS protocols for screening and assessing concussion, there isn't limited to functional medicine practitioners, who will probably have a different perspective from, say, their standard GP or other colleagues.

Nicola Hunt

As yet, there is not a lot of concussion within the management within the NHS, it's tending to sit in private practice, unfortunately,

Steven Bruce

although most guide guidelines about it,

Nicola Hunt

not yet, not not concussion specific, we have the concussion and grassroots sport, article and guidelines from the government that was released earlier this year. So they're very clear. And they say that, you know, if there is this suspected concussion, it should be assessed by a 111, or by a suitably qualified health professional. But it's going to take time before this specialist concussion clinics are within the NHS. There are sports medicine doctors who specialise in concussion that do sit within the NHS, but it's not a big service that is out there at the moment. So you mentioned hormones, so you can get endocrine dysfunction. So the hypothalamus pituitary adrenal axis, and is one of our four main neuro endocrine pathways within the body. And the hypothalamus and the pituitary gland both sit in the brain. So it makes sense that if you've had an impact to the head or force transmitted to the head, that can be disruption of that pathway. And the main hormones that they control are things like our growth hormone, our female hormones are male hormones, and are cortisol. So they can lead to sort of things like energy depletion, they can lead to mood changes, they can mute in women, they can change sort of menstrual cycle in both both genders, sex hormones, so sex drive, and gastroenteritis title issues as well.

Steven Bruce

So you said just then it makes sense that these things could be effective. Does that mean that this is pure theory? Or is it all? You mean, it makes sense. And it's been proven that this is the case,

Nicola Hunt

it's made sense. And it's proven, not everybody will have that dysfunction, but there will be a percentage of it that we'll do. And this is one that can be tested by the blood tests because you test for the specific hormones. So the assessment of sort of metabolic inflammation and hormonal is via the history by talking to the patient, finding out, you know, what their problems are. Now, if they've had sort of menstrual cycle changes, since the accident or the impact, then again, that starting to sort of ring some bells that, you know, actually we need to investigate

Steven Bruce

that immediately. One takeaway for someone in clinic isn't that someone comes in they've had a road traffic accident, you're thinking, Okay, we've got whiplash here. Well, I would not in the past have thought with a patient I thought had whiplash to ask whether there had been menstrual changes, but that might be a nice, a nice, it might be a clue to distinguishing one from the other.

Nicola Hunt

Yes, absolutely. Yes. Yeah. And then sort of the treatment, as I said, you know, we're looking at the inflammation and the gut brain access. So diet is hugely important. supplements, and both again are individualised. The take home message for diet is, you know, clean diet. No unrest and carbs, no sugars, no alcohol, no caffeine, good hydration. But obviously, we would then sort of individualise it to the person sat in front of us, there

Steven Bruce

must be a fairly standard array of supplements that are relevant to the situation here, isn't it? I know you said it's personalised. But how you To what extent is it personally? What supplements are you looking at in particular?

Nicola Hunt

Again, this is because I'm not a prescribing physiotherapist, I have to be very careful with that. So, as part of the complete concussions network, we have a advice sheet that is written by somebody who

is specialist in functional medicine, and we provide that information to them. Again, you know, because I'm not a prescriber, I have to be very careful saying take these supplements. But yes, that you know, there are and it's it, you know, it's things like you know, having oily fish in your diet, potentially taking your Amiga and supplements, but making sure you're getting the balance of the Omega three and Omega six Correct.

Steven Bruce

What's interesting, we've actually had a chiropractor on the show talking about neuro inflammation and supplementation is fascinating to hear his take on that, but we'd better move on to Yes. Maroun vision.

Nicola Hunt

So the next one will be looking at vestibular and vision. So the you know, the important clue here is the vestibular system. So the vestibular system is a little organ that sits in your inner ear, it's got sort of two ends to it the Cochlear end which is responsible for our hearing, and the vestibular end, which is responsible for our balance, three semicircular canals filled with fluid. And at the bottom of those canals set the calcium carbonate crystals in the huge pool. As you can imagine, impact to the head, there is the potential for those crystals to move and to move into the semicircular canal. And that gives us what we call positional vertigo. So benign postural positioning

Steven Bruce

might be a consequence of this as well. We've done a couple of shows on BPPV as well,

Nicola Hunt

right? Yes, yeah. So between five and 10%, of people with a concussion will have coexisting BPPV. So that's a nice quick, when we put some infrared goggles on them, we do some positional tests, we look at their eye movements. And if their eye sort of starts flickering very, very quickly, which we call an A stag miss. Depending on what position they are in, we know which canal has the crystals in it. And then we do some repositioning manoeuvres to put them back where they're supposed to be. One of the other things is that you can get his hypo function, so under functioning of the vestibular system. So it can be you know, you do see in the literature that the words vestibular concussion, so it's actually sort of, you know, no structural damage to the vestibular system, but it's had a bit of a knock, and it's not functioning as well as it should do. And we're going to look at some of the tests that we can do to look at sort of the vestibular system in a bit more depth to see why it's not functioning. But the sort of the two important things that we do get post concussion is thinking about the vestibular ocular reflex. So as the name suggests, we flex between the vestibular system and the eyes, the ocular. And that reflex enables us to be able to keep our eyes still on something and move our head with being able to still look nice and clearly at the image and the images nice and sharp. If that it reflex is affected, then you can find that vision gets a bit blurred or you see double, or you have trouble concentrating on things because your eyes are struggling to look at the same point. And that's where we come on to convergence insufficiency. And again, looking in the literature, some papers say you know, they expect everybody to have a convergence insufficiency in the initial phases. And again, it's how long it persists. But convergence insufficiency basically means that when you bring your vision into something that's close up, can you get both eyes looking at the same point? Or does the point that you can look at something with both eyes, has it moved out here because you can't actually bring both eyes into the same point?

Steven Bruce

I guess you have to have a baseline for that because you wouldn't know what it was before the concussion. You would expect

Nicola Hunt

it to be no greater than sort of six to 10 centimetres depending on their visual acuity.

Steven Bruce

Can I put a question to you here or an observation here from Tom. Tom says My wife was knocked over and landed on her head heavily about eight weeks ago. She had a fractured skull with a subarachnoid haemorrhage, gosh, she has now been left with full loss of smell, loss of taste and loss of hearing in her writing in her right ear and severe tinnitus. He asks Is she likely to get those losses back?

Nicola Hunt

Obviously, without a clinical assessment, I wouldn't be able to answer that in any depth. What I would say is that that could be central from the brain. It could be from the cranial nerves and inhibits cranial nerve damage as we know nerves, don't we generate quickly or well, but if it's down to the head injury, and then potentially Yes, but

Steven Bruce

the value in him getting assessed whether it's his cranial or whether it is concussion, or does it make no difference? We just wait and see what happens.

Nicola Hunt

It's not a concussion because she's had a subarachnoid haemorrhage. So that is a structural brain injury. And, and again, when two

Steven Bruce

could go together, surely

Nicola Hunt

once you had a structural injury, then then that sort of takes precedence over the over the concussion. So yes, there may be some sort of concussion type symptoms, but the sub subarachnoid haemorrhage is a bleed into the subarachnoid space, which will have had some compression on to the brain structure, and therefore there will be structural changes, not just functional changes that we see in a concussion. Okay.

Steven Bruce

So, Tom, we're not able to help you too much on that one at this stage.

Nicola Hunt

But it's very difficult to give individuals clinical sites. Yeah.

Steven Bruce

And we do we always get questions like this for for obvious reasons. So when we've got an expert like yourself, one, now we've got our model waiting very anxiously in the wings to be worked on. So we've got to get through these quickly.

Nicola Hunt

Yes, so time to do some practical. Alright, let's have a look at the vestibular aspect of it. And you know, how we would assess it, how we assess the vestibular ocular motor system, I talked a little bit about, you know, popping the infrared goggles on and doing some positional tests. So what we're going to look at today is

Steven Bruce

video nystagmus graphy. That's a great.

Nicola Hunt

We caught we do VMG, because it's a bit of a mouthful. But yeah, so looking at sort of the the vestibular ocular motor screening, and looking at the clinical test of sensory integration of balance, when we're looking at sort of which bit of balance is affected. Okay, let's go do some bad.

Steven Bruce

This is Susie Nicola. Hi, Susie. Nice to meet you. Thank you, Susie, for stepping into short notice this evening.

Nicola Hunt

So gonna start with just assessing convergence insufficiency, because that's something we see quite a lot of in concussion. So, as I said, you know, we would normally expect depending on sort of age and your visual acuity for that to be sort of Vande about sort of six centimetres, 10 centimetres. So what I'm going to ask you to do is just to pop that onto your cheek, and then I'm going to just ask you to slide this towards you, and tell me when that x becomes too.

Lovely, so we can just bring that in nice, simple way of doing it. And Susie, you'll be pleased to know that you're not

Steven Bruce

Should we try and give Susie a concussion, so you get some positive? No,

Nicola Hunt

that will be. So that's just how we would assess convergence insufficiency. If it wasn't normal, then we'd be wanting to give some exercises for you to practice with that. So what we would usually do again, I'm not an optometrist, I'm not a behavioural optometrist. So I would do sort of baseline, if you had a problem of that I would get you doing something called pencil push ups, which isn't as strenuous as it sounds, what it basically means is you bring a pencil in towards you keep tracking the pencil as it comes into you. Then you would look away at something in the background. And then you would look back to the pencil away to the background back to the pencil, and so that you're working on bringing that pencil in and just seeing one pencil. The other one that we would use is called the block strings, which is string with three beads on it. And again, looking at getting you focusing on each one, so that you're able to sort of alter that length and gradually bringing them in. That will probably be as far as my remit went as a physiotherapist. If they weren't doing the job, then I will be wanting to be firm on which to a behavioural optometry, I

Steven Bruce

always ask this question when anybody talks about giving exercises of any sort how many times I've got to focus on the pencil and how often per day.

Nicola Hunt

So because we're retraining the brain, then little and often. So again, it's around sort of, particularly with vestibular and concussion, it's around giving the brain a bit of an error message. So it knows what it needs to correct but not overwhelming it with a big error message so that it just feels very symptomatic, and you don't get any learning. So that's sort of the the sort of very, very individualised the prescription of exercises. So in some patients, it may be two seconds. In others, it may be 30. And we ask them sort of you know, to do it, rest and let any symptoms subside. Do it again, rest and let any symptoms subside, do it a third time and do that three or four times a day. Again, if that's not tolerated, we may have to wind it back, but it's around sort of that frequency to retrain the brain. We want a tiny bit of increase in symptoms otherwise there's nothing for the brain to recalibrate but it's a big increase in symptoms, you just don't feel well. And then you're going to not like your physio, we try and avoid that osteopath.

Steven Bruce

Or chiropractor or chiropractor.

Nicola Hunt

So the next thing we would do is sort of what we call vestibular ocular motor screening. So we want to know, is the vestibular ocular reflex working? And is the sort of the control of that function causing any symptoms? So we're always assessing for symptoms when we're doing this. So we want to know, is it causing any nausea? Is it causing any dizziness? Is it causing any brain fog? And is it causing any headaches? So they're the four symptoms that we would score on? And we would say, you know, on a scale of nought to 10, do you have any of those symptoms now? And then, as we go through each test, we would ask you again, you know, have you got any of those symptoms? Where would you score them? So we know, again, what's triggering the symptoms, and therefore what exercises we need to prescribe. So there's, there's a bedside way of doing this. So two lollipop sticks, clean ones, I may add, I buy them from craft shops, and I don't take I don't take the Magnum off them. And we would look at sort of, do you have the symptoms, and then we would sit here, or I would just come in front of you, and ask you to keep your head still and follow with your eyes. So again, sort of both 30 degrees to the left 30 degrees to the right, and bring it back to the middle. And, again, do you have any symptoms? Having done that? And then we would do so that would be your smooth pursuit, then we would look at what's called saccadic eye movements. So I put the two sticks up, can you move just your eyes going between the two of them? And this one, we would just go for a little bit longer. And again, we would ask you, do you have any symptoms doing that? And then we would want to go vertically? And again, we would ask you, do you have any headaches, dizziness, nausea, or foginess doing

Steven Bruce

there's a little bit of science in distance from the patient and separation of the logistics. Yeah,

Nicola Hunt

so you're looking about sort of everything, you've just everything you sort of straight on, you're thinking about sort of a 30 degree, so that was zero 30 degrees that way, 30 degrees that way, or 30 degrees, up 30 degrees down, and at a roundabout sort of three foot, which despite the fact I wasn't born, when we had feet and inches, I still talk about three foot, but you know, but yeah, and then we would look at the one that's most likely to cause symptoms, which is your vestibular ocular reflex. So again, I would sort of hold that at a comfortable distance in front of you. And this is the one that I

would actually set a metronome for you. And get you to look at that. So I'm going to demonstrate it. So you would hold it out in front, keep your eyes on it. And then it's a very brisk turning of your head, keeping your eyes absolutely on the x. And then you would do it again, vertically. Again, you will be asking, Do you have any symptoms? Do you have any dizziness, headache, nausea, or fogginess after that one. And then the final one of that test would be your visual motion test where for that when I would actually ask you to stand up, put your hands out in front of you keep your hands out in front thumbs pointing outwards, focus your eyes on your thumbs, and then I would just get you to swing side to side. Keep your eyes on your thumbs and again, I will be asking you Do you have any dizziness? No, I'm going to stop there nausea, vomiting, or brain fog. Okay, so if you have a seat so that would be sort of what we would call a clinical vestibular ocular motor screening test. And again, gives you a score because you may say oh, you know my headaches three after that one. And we we then you know, we do the next one on my headaches and now seven. It gives you an idea of Where's causing the problem and therefore which exercises do you need to work on smooth pursuit? Do you need to work on sick aids? Do you need to work on visual motion sensitivity. However, because I specialise in concussion, we get to the high tech option in clinic. So we have something called the neuro flex headset. So this is a VR headset and it can then look at those eye movements a little bit more objectively so would you mind just slipping your glasses off and I'm gonna pop this over your head of me

get out a nice tight fit that bill fairly comfortable. Yep. The operative word being fairly. So I'm just going to calibrate it. You'll see a little dot come up. Just look at the data as it goes around.

Steven Bruce

Is that what you're seeing Suzy. I've got word saying look at the green dot and the green dot lovely

Nicola Hunt

It's just finishing off calibrating. So once the calibration is completed, we're going to look at smooth pursuit with the head fixed and smooth pursuit with the head pray, because that gives us an idea whether it's purely concussion, or whether there's a neck element. And we're going to start that one. So we're going to start with the head free first. So as soon as we've got that calibrated, and the important thing is that if we're going head movement, we always make sure that it's in the middle to begin with. You still got a squeak that green dot there? Yep.

Steven Bruce

How many clinics would have this sort of equipment? Do you think?

Nicola Hunt

There are not many in the UK at the moment? It's very big in Australia. And I know that the British horse racing have invested in it so that they can do the concussion assessments with it. It's a quick test.

Steven Bruce

Is this the sort of thing that's being used pitchside in professional sport,

Nicola Hunt

and there, there is some football clubs that have already invested in it. And they're the early implementers and we're going to be seeing some more coming on board soon. Moving Okay, let me just

Steven Bruce

was challenging when you doing this demonstration? Is it that's the time when these things decided they're going to play?

Nicola Hunt

I think the it doesn't like the lights as well. So hopefully we've got enough of a seal on there that dock moving now?

Steven Bruce

No.

Unknown Speaker

Oh, yes, it is now.

Steven Bruce

So what we should see is a mirror of what Suzy seeing.

Nicola Hunt

Yes, we will be able to see her eyes as it's moving around. Okay, so for this one, I want you to follow the target with your eyes and your head keeping it in the centre of the screen. So you're going to need to move your

Okay, so the target will move around, use your eyes and head and try and keep it in the centre of the beam.

Steven Bruce

Is that light leakage which is causing

Nicola Hunt

that we're just getting a little bit of light into it. Sorry, I just recalibrate.

Steven Bruce

We use it more tightly around Susie's head. I think we get the idea on this because we are seeing Susie's is there, aren't we? Yes. And just above them. I think we're seeing the.on the screen as well as she's looking at it.

Nicola Hunt

Yeah. So we can I can see there. What she is looking at Yeah.

Steven Bruce

We might have to move on from this might we Nicola because otherwise, you're going to be constantly having to press that button. And we have had at least a chance to see what's coming across on your screen. But you said the next one would be head steady head still in following with just the eyes?

Nicola Hunt

Yeah, so I'm just going to tighten that a little bit for you. Make sure we've got that over your eyes. So the next one if you just follow with your eyes

Steven Bruce

so that's much more reliable. Oh, well, she wasn't moving. Okay, so having said that, you're looking at this, what are you getting from this? How do you assess with the machine assessing what

Nicola Hunt

the machine is assessing? What's happening there?

Steven Bruce

I see the progress counter at the side of this. Yes.

Nicola Hunt

I believe you that headset,

Steven Bruce

like a little bit of visual display from that, but not quite what we hoped I think.

Nicola Hunt

So what you know, what we will see from that is the eye movements coming out. And as I say it's very difficult to not get the light leaking in with such bright lights. And obviously, I would do it in a normal clinic environment. And then we would get sort of, we would be able to see what the eye pattern of movement is. And we would look at whether when you're just moving your eyes, everything is fine. And then when you bring in any neck movement, whether there's a problem and whether there's a difference between the two. So if the head is still and we have got problems tracking, then we know that it's an eye problem. So probably vestibular but if you've got the head movement, then you've got sort of cervical and more vestibular sensitivity coming in

Steven Bruce

when tracking problem would be would show up as an inability to track or just the delay in getting

Nicola Hunt

it can be either it but it I mean, it measures down to microseconds. So, you know, it will tell you that you were sort of 10 microseconds behind the target, your normal range, for sort of smooth pursuit would be sort of 200 to 400, it will tell you whether both eyes are looking at the same place. So again, you've got sort of a seven degree is normal. So you want I could be looking here, and when I could be sort of seven degrees to the other side, but then if it's more than seven degrees, that then gives us a problem. So a person who would have that sort of problem may say, they have get headaches reading, they have problems concentrating.

Steven Bruce

Right, what else can we make it easy

Nicola Hunt

to so let's get you let's assess your balance. It's not good. So if you want to stand on our feet a little a little bit wider apart and put your hands on your hips. And we use this position to make sure that every time we test, it's in exactly the same position. So what we would do is just ask you to stand as

still as you can. From the first to the second beep. And what we're just doing is assessing the different parameters of balance. So we have three main systems of balance, we have our vestibular system, we have vision, and we have proprioception, the information that you get back from your muscles joints, your body, particularly for proprioception, the neck, and the feet, ankles are involved with given that information. So first one hard surface eyes open is using all three balanced systems, we would then go on to do the next one. So this time, same position, I'm going to ask you to close your eyes. So in this test, we will just be looking at proprioception, and vestibular because we've taken vision out so we're no longer assessing the the impact of vision on balance. And it's a little bit like peeling an onion, we go through each layer, until we're just working with the vestibular system to see what effect on balance that has

Steven Bruce

no I can't see anything on your screen at the moment is it we'll get something telling us what happened as a result of this.

Nicola Hunt

This was the this was the first centre of gravity centre of pressure path. And this is the second if I can just ask you to step back off. And then we confuse proprioception by putting a compliant surface on so a nice wobbly surface and get you to stand in roughly the same position again, on one leg with your eyes or hands on your hips, and eyes open for the first one. So again, what we're seeing on here is this is the sway path that Suzy is doing so everybody will sway a little bit. But what we want to know is how much sway there is. Now this is a computerised programme, you can do exactly the same without the force plate. And you're just clinically watching somebody to see which ones they have problems with. So here we're assessing your vision and vestibular function, because we've as much as we can take one out in a clinical setting

Steven Bruce

issues is wobbling around a lot more on this soft surface she is

Nicola Hunt

and then don't have a good sense. I don't know if you'd like to stand in the same position and close your eyes. So this is mostly assessing as much as we can clinically the vestibular system. And we'll just make sure she doesn't actually follow through on camera.

Steven Bruce

We'd like a bit of slapstick. Huh.

Nicola Hunt

Lovely, and you can step back often there. So you can see from that when if we look at sort of the different paths has central sway path was 21 centimetres, when she was using all 403 balanced systems. 23 eyes closed on a hard surface. But then as we came into looking at sort of just reducing proprioception and working on sort of vision and vestibular bit more wobbly. And then we looked at just vestibular on its own right then much higher. And there are tables that we can use that data against to say whether that fits the population norm, or whether it's way outside that if you're doing it without a fourth place, and you're just looking at somebody, if we were looking at you, you you are obviously a little bit wobbly on that fourth test when you had there. So we go, you know, again, you know, if there's something going on here, and again, we don't treat tests in isolation, we put together the whole picture,

Steven Bruce

we're interested in a lower, slightly lower level of sophistication. And this would be that we use a Force Base in our clinic as many of you for for gait analysis. Yes, he has a static assessment and function. You can see the different, yes, the pattern of people swaying, and I imagine we could get a foamy thing and stick it on top and get similar results. There wouldn't be to assess them quite as accurately as your machine here but it will be useful

Nicola Hunt

depending on what gait assessment that you have, then yes, you can absolutely do the same test on the on the static testing. Because I have a gait analysis mat on in clinic as well. And it does depend if this is out in the community then I will Use the same, we use

Steven Bruce

the ahi one here, right? Yeah, we've all got similar Yes, yeah,

Nicola Hunt

they all get have similar capacity. If you can do a static stand and measure centre of sway, then you can do this test on it. Okay. Okay. So that's sort of where we would do with vestibular, we would, I would look at sort of some of the things specifically around sort of doing a head impulse test to see whether that vestibular ocular motor, vestibular ocular reflex is working. So again, and again, but you know, I can do that with the VR goggles.

Steven Bruce

Interesting question here from Kim. Kim says, if any of these tests turns out to be positive, would you still go through the whole gamut? Or would you just send her off to someone for a more detailed investigation?

Nicola Hunt

When you're assessing a concussion, you would go through all five aspects, because you don't know whether there are other things happening. Okay. So you know, we would always look at, look at treating inflammation, advice on diet advice on supplements, advice on good hydration with fluids, we would always do the exercise test. And then again, you know, we would look at the vestibular, and if there was anything showing, we would treat or send it to somebody who was capable of treating, but you would still then go on to do the next bit, which is the neck. Okay. So again, as I said earlier, you've got a concussion, it's pretty likely that there's going to be some lash type injuries there. And I am not going to stand here as a non MSK physio, and teach osteopaths and chiropractors about assessing the neck. So I'm gonna completely vary standard range of motion. So it will be a standard neck assessment. And passive. Yes, you would look at active you would look at passive, you would you would assess muscle tone muscle tension, you would look at joints, particularly for the facet joints, and particularly the upper spine, which tend to be the ones that give rise to sort of the more overlapping symptoms. The couple of tests, I am going to demonstrate that may be something that is not routinely done with MSK, physios, if I can just get you to turn this chair around. And this is the joint position error test. Now this size of target, we should be cents 90 centimetres away from it, I'm going to just pop this on your forehead, this is a laser pointer.

Steven Bruce

And in case it's not clear to the audience, we've got a target on an a4 sheet of paper that haven't weighed so we're, what did you say 90 centimetres,

Nicola Hunt

we should be 90 centimetres, we're slightly further than that, which means that your your test results might be, you can use a bigger target, and then you can be further away. So we've got a laser point there. And we bank on the middle there, what we want to know is what's the cycle proprioception like, so if you close your eyes, and turn your head to your right, and then try and put it back in the middle. And then open your eyes and see whether you were right. Okay, and we do, it wasn't bad, it wasn't bad, you were just on the edge of the green, so did the camera. Close your eyes, turn your head to the right again, and come back to the middle and try and put it back in the middle. Okay, so again, that that will be sort of an error to the left. And then we do the same, we do it three times to the right, do the same to the left. So close your eyes, turn to the left and back to the middle and open your eyes. And you can just sort of see what the cervical proprioception is like. It's a bit of a clue that the target is colour coordinated, you should be back in the Green. Yellow is sort of borderline red and outside of the red is showing that there is some issues with reception.

Steven Bruce

Susie here, as far as we know, doesn't have any particular problems. But yeah, she's not in the green. So essentially, this is more significant. If you've got someone you suspect of having

Nicola Hunt

we are too far away from the targets. Had we been? Had we been at 90 centimetres she would have been in the target. Yeah. So yeah, that was the reason that that went a bit wrong. But we wouldn't have seen very much if you were only 90 centimetres from the wall. So but clinically, we would either use a bigger target or be a lot closer to it. The other thing that we would do for looking at how the neck was involved, is get you back onto the balance plate again. But this time, I'm just going to change the programme that we're doing. Look at cervical challenge. So if you want to come and stand back on here, and what we're looking at is how much of the neck is influencing balance. So hands on your hips again, and we're just going to do a 10 second test to get a baseline for this one. So eyes closed still as you can

And again, we're just looking at sway to see what's going on there. And then we go through each of the neck position. So if you dropped your chin to your chest, still with my eyes closed, eyes closed, and still as you can

Steven Bruce

and how many tests on

Nicola Hunt

so we would do flexion, extension, left rotation, right rotation, left tilt, right tilt, and then we would do the position depositional, tests for the semicircular canals. So we don't need to run through all of these right now. But it gives you an idea of what it is that we would do. And again, you can do that clinically, you know, does the neck position change balance? If someone's balance is very good, then get them on one leg? And does the neck position change their ability to balance because what we're looking at is where is the neck involvement, you would say, if it's a stimula, you would see some changes as they move their head. But once they're in position, and the head is still, then the vestibular system isn't changing very much. So we would run through all of those to see the neck

there. The other thing we can do is, do you want to just come and have a sit down again, is when we did the voms test. So it may be that when we did it in neutral with the neck in neutral, and we were looking at the different vision functions, so smooth pursuits, or Cades, and your vestibular ocular reflex, that there was no problems. But then if I get you to turn your head 30 degrees this way, and then I do the same set of tests here where we're asking you to follow again, does that trigger any symptoms? Or is it that your eyes aren't tracking properly? And again, if that's the case, that's going to have some neck involvement, so you would be treating the neck?

Steven Bruce

Thank you, we are getting close to running out of time. So I think we can sort of get out and take a couple more questions. And Susie, thank you again. And we'll come back over to the seating area. And we'll see if we can work through these last few questions. It's all fascinating stuff. And I suspect that the audience will be saying, well, that's all very well, but we don't have this kit in our CRM clinics is there. I can't imagine osteopaths and chiropractors being fascinated by the science and the physiology behind what's going on though. So is there a role do you think for them to do what you do and become vestibular rehab specialist or concussion specialist?

Nicola Hunt

I think concussion specialist? Absolutely. I mean, the complete concussions network is led by a chiropractor. Not a physio, and cam is a chiropractor. And probably the majority of members in Canada and Australia and America, are chiropractors, not physios.

Steven Bruce

Which kind of leads me on to a question from Matthew here, which is, what's the prospect? Well, is there any realistic chance he says, of getting this sort of assessment and treatment on the NHS? Or are patients always going to have to shell out for private treatment?

Nicola Hunt

I would like to say it's going into is going to ultimately be in the NHS. And you know, the specialist head injury units do touch on some concussion rehab if there's persistent symptoms, but again, the head injury units are few and far between and they are very, very oversubscribed for their

Steven Bruce

exams of physiotherapists working in the NHS, we could probably have a long discussion about the relative merits of private or NHS physio, and the equipment that you've demonstrated is not desperately expensive. ForcePlates are a few 1000, aren't they the computers are a few 1000s on. So all this stuff would be really simple for the NHS to introduce, you'd like to think and actually being able to put, you know, all the millions of people are involved. If it's only just sport we're talking about rather than road traffic accidents and other potential sources of whiplash. Being able to send them straight into a specialist clinic, we'd be really helpful.

Nicola Hunt

I would love to see that. And maybe one day the NHS will be running specialist concussion clinics, but outside of the sports medicine field, which there are sports medicine doctors within the NHS, and there is there isn't much

Steven Bruce

but presumably those sports medicine doctors, would they have access to this sort of kit?

Unknown Speaker

I would hope so. Okay.

Steven Bruce

Interesting question from Aiden. Aiden says what's the latest on the pitch side saliva test to diagnose concussion? It seems to have gone very quiet since initial promise a couple of years ago and I've never heard of it.

Nicola Hunt

So yes, there was there was a lot of research into the fact that enzymes are released and that they can be picked up in the saliva. The research is still going on. It's probably just not forefront of the media at the moment, but it is still being looked at and developed.

Steven Bruce

Okay. Back to Matthew. Again. He says what's the mechanism of the convergence insufficiency that you talked about earlier? And does it involve specific nerves or pathways? Or is it something like generally LOA Could sympathetic tone?

Nicola Hunt

Yes, yes to both really. But that's where your cranial nerve screening comes in. So it can be due to a cranial nerve injury, which is affecting the ocular muscles. If that is the case, then again, you would need to refer in for a neurologist to review that if there's cranial nerve damage, but if it's just sort of increased sympathetic tone, functioning of these are sort of a functional sort of dysfunction, that the eyes aren't functioning together, or that they start, but they get tired. Certainly in an acute concussion, you know, it is just that central control of the eyes converging to the point that doesn't happen properly, which is why most acute concussions will have some element of convergence insufficiency does usually resolve as the brain heals. But if it persists, then you would need specialist assessment. Yeah,

Steven Bruce

I guess I'm probably going to expose my own ignorance here. But if you're doing your cranial nerve testing, and you find that one of those tests is remarkable in some way, how do you know that it's the cranial nerve? That's the problem, as opposed to it being something else from a concussion syndrome. So that when you made it sound, as though you'll be able to say, easier to determine whether this is just this is a damaged cranial nerve, or whether this is a concussion syndrome that we're talking about, which might be causing these symptoms? They don't get that

Nicola Hunt

wrong. Yes, you're correct that yeah, what we would do is we would do a cranial nerve assessment. And you would go through each of the cranial nerves, looking at sort of some of them, particularly the ones that sort of look at convergence. They are different functions. So you would look at sort of the picture as to what you're seeing where you're seeing the deficiency. Yeah.

Steven Bruce

Okay. And he says, Is there a link between the symptoms of long COVID And concussion, which seems similar in quality findings and presentations?

Nicola Hunt

Very, very different mechanism. Long COVID There's still so much research going into it as to what's causing it. We are, I am definitely seeing a lot more vestibular patients following lung COVID or COVID, or COVID. vaccinations.

Steven Bruce

Yeah, I mean, the trouble is long COVID seems to be held up as a culprit for an awful lot of things. I wonder whether that's convenient. I don't mean that in a nasty way. I just mean, well, we weren't we didn't have a culprit before COVID. But now we've got

Nicola Hunt

it. Yeah. Yeah, I mean, for concussion, you have to have the mechanism of injury. And so you can't blame that on COVID or long COVID. There has to be a mechanism of injury. Certainly, if you have a persistent concussion symptoms, and you then get COVID you are likely to flare your concussion symptoms. And to unpick

Steven Bruce

the other side of that, which is if you've got COVID, or you've got long COVID Does that make you more susceptible to persistent concussion perhaps? Yeah, that that's hard to say, isn't it? Somebody called TK and is asked about nutritional supplements, but also whether you're recommending ketogenic diets due to problems with getting energy from glucose after concussion. Another don't know, I don't know the extent of your nutritional expertise in rehabilitating people after injuries like that.

Nicola Hunt

So I tend to defer for the supplements to somebody who's much more specialist in that with regards the ketogenic diet, we recommend a reduction in calories and and not true ketogenic diet. The reason being is because people are less likely to follow it. And there is evidence that that support it being effective. But we're trying to give people that you know that the diets restrictions are quite significant for sort of a four week or eight week period, depending on whether it's acute or persistent symptoms.

Steven Bruce

What's What's the rationale behind cutting calories, we're assuming, let's assume this is not someone who is overweight and we're not trying to make them lose weight through calorie loss. How do cutting calories affect concussion syndrome?

Nicola Hunt

Again, it's around sort of, we tend to get the empty calories, you know, by following the advice you are taking calories in down by about 30% Because you're you're getting rid of refined carbs, you're getting rid of alcohol, you're getting rid of sugars. So people's calorie intake tends to drop by about 30%. Yes, the ketogenic diet can be useful in concussion, but it's not evidence based as the way forward for it just because of compliance issues.

Steven Bruce

I have to say my, my own limited reading in this field is that there is no evidence for any form of nutritional advice or dietary advice in medicine. For donkey's years, we've been saying to people exercise more and cut your calories and all the evidence says it's totally ineffective for weight loss.

But doctors don't get any nutritional training to speak of in their education now, I know we can, we can have a long long conversation about diets. I'm sure you've been lots of other people. The stupid ones where you did mention BPPV earlier on. Let's stray off concussion just for a second talk about your your approach to BPPV. And we don't have very long left but are you an Epley manoeuvre practitioner?

Nicola Hunt

So the Epley manoeuvre treats the canals and treats the crystals in the posterior canal, the so you have to be able to identify which canal the crystals are in, and then do the correct repositioning manoeuvre for that. So again, it's knowing your risks,

Steven Bruce

what are the risks, then are the risk simply that you won't fix it or that you'll make it worse,

Nicola Hunt

so you can convert? So if you've got the crystals in one canal, and you do the manoeuvre incorrectly, you can move the crystals into another canal, rather than putting them back where they should be? So then you get a more difficult to treat BPPV? And then you you've then got the risk of you know, you've got to assess your patient? Is the younger, the elderly, what are the risks of putting them in those positions from a sort of pain and tolerance point of view? But, yes, for BPPV, they would be sort of assessing which canal the crystals are in, and then a repositioning manoeuvre to put them back, bring them back a week or so later, and see what symptoms of any there may need it repeating.

Steven Bruce

Do you see many patients with BPPV? Loads? Very clearly, you're a specialist clinic, you're likely to see more than less. And returning to concussion, where do you most of your patients come from? Who is referring to you because you're not being pitched side work or, you

Nicola Hunt

know, I don't do pitch side work. I have a concussion clinic. And it tends to be horse riding, motor racing. Or that road accidents rarely. And I think sort of rugby particularly has got it sorted in the main compared to most other sports.

Steven Bruce

They don't need you they've got it all into,

Nicola Hunt

they do have they do have quite a good network within there. Because they manage their acute concussions well. And and again, you know, it's coming through into the other sports, I do have a link with the local rugby club. And we've had some discussions around sort of making sure good baseline testing is done evidence based testing, so that they know what their sort of baseline is to return to play. But from the clinic point of view, I tend to get sort of most of them are coming in through the horse riding or motorsports or just sort of road traffic accidents.

Steven Bruce

And are you talking about professional horse riding? Are you talking about sort of an amateur ride? So you're presumably you're getting the word out to people that they have to consider concussion?

Because, you know, I have a wife who's obsessed with horses, but I think he's ever mentioned the word concussion to me once it's not somebody who thinks that he thinks about broken necks and fractured ribs. Yes.

Nicola Hunt

And all that sort of thing. Yeah, I mean, certainly, the British horse racing are quite hot on concussion management, and testing jockeys who come off. So they are certainly sort of looking at that. And as I say, they are one of the organisations that's invested in the new effects head. So

Steven Bruce

we'd like to think that the public generally are more aware of the dangers and the prevalence of concussion. Now, because it's been such a big thing in sport, you would hope you would wouldn't, given that there are millions of young people watching rugby, watching football, and they will have mentioned every single game the problem of concussions, they will be aware of it. And he says, Wait a second bout of concussion following an initial concussion result in different findings or different presentation.

Nicola Hunt

It depends how soon after the first concussion, and that's one of the reasons why it's important to not let people return to play that there is a risk of another concussion. Because second impact syndrome before the brain has fully healed. So in that sort of three week period can give permanent brain damage or death, you know that that is the real danger time. If they have a second concussion after the first concussion has fully healed, then they may get more severe symptoms from the second concussion. And obviously if they continue to have numerous concussions, then the severity of symptoms and the length of recovery tend to increase with each one.

Steven Bruce

Yeah, we can probably have a long chat about how boxing is handling concussions. Last question, I think this one is from four eyes McGee. Whoever follows But would you do the Epley manoeuvre in older patients or those who have increased risk of cervical artery dissection or cervical artery damage? Now, interestingly, I went to Oxford Brookes somebody had done some research into this. And it's widely available wasn't just an open books, but actually older people are less at risk of cervical Artery Dissection because the offer is a much harder I guess. But those people who are at risk, you wouldn't, you wouldn't do that.

Nicola Hunt

I would do a Vbi vertical pacella insufficiency test before I did an episode on the shoulder

Steven Bruce

that's been discredited, hasn't it.

Nicola Hunt

It still gives you a sort of an idea of

Steven Bruce

your past and current practice, we're all told that it's more likely to cause an incident than actually give you safe findings that someone's at risk. But there are very few tests around.

Nicola Hunt

There are very few tests around and you would take a very clear history. And again, you know, I would only do the Dix Hall Pike, which is the assessment tool and then progressed to an AirPlay on somebody who was presenting with BPPV symptoms. So that's positional vertigo. So they turn their head in a particular they turn to the left they get dizzy or they turn to their right, they get dizzy or they roll over in bed, they get dizzy. And they that dizziness is rotational dizziness. So they it's true vertigo, and it only lasts for a few seconds. They are your clinical presentation of the BPPV. If they don't have the clinical presentation, I wouldn't do a big screen for

Steven Bruce

you. And you've stopped bang on the time that we need to stop there. Nick, I think you've got a 427 people watching us this evening. So clearly another topic of interest to a lot of people. I'm sure there'll be lots more than watch the recording when it gets posted. So thank you very much for spending your time with us. Well, thank

Nicola Hunt

you for inviting me.

Steven Bruce

It's been great. It's been great to have you back a second time. I love single YouTube's new toys over the air. were that easy. That's all we've got time for this evening. So thank you very much for joining us. Bye for now.

DRAFT TRANSCRIPT