PHYSIOUK

Online Interview

A Clinical Whiplash and Neck Pain Update

Chris Worsfold
Clinical Whiplash & Neck Pain Specialist

Chris Murphy
Director of PhysioUK

020 8394 0400 | info@physioUK.co.uk | www.physioUK.co.uk

Transcription of online interview between:

C: Chris Murphy (Interviewer)

CW: Chris Worsfold (Clinical Whiplash & Neck Pain Specialist)

C: Hello. Welcome to this interview with Chris Worsfold. Chris is a physiotherapist. He's been qualified a number of years and worked in different sectors, both in research and in clinical practice and he has a specialism with respect to whiplash, which is obviously what we're going to explore today. Chris is going to be giving some evening lectures in the South of England later in the year, and so the goal of today was really to check in with Chris and find out a little bit more about what he's going to be talking about but also, certainly, to give those of you that are listening a few little golden nuggets to take away so that you can start to maybe just think about some of the patients that you're seeing and just do things a little bit differently and help you make the decision whether you'd like to hear more at the evening. So, first thing's first, hello, Chris.

CW: Hi, Chris.

C: Hi, welcome to the call and thanks so much for your time, I really appreciate it.

CW: No problem. No problem at all, pleasure to be here.

C: So, with respect to the evening, I know from when we've spoken before, the key areas that you wanted to look at would be the kinematics, the biomechanics, a little bit about the pathology and then, certainly, the sensory motor impairment, which I know isn't always covered in as much depth, certainly from my experience. So, just to kick us off, with respect to the kinematics and biomechanics, what's changed in the last five, ten years that we now know, that we didn't necessarily know before, that's useful?

CW: Yeah, I think, when I first approached this subject I was taken aback, really, by the amount of research in this area. A phenomenal amount of research has been undertaken and, when we talk about kinematics, we're looking at the movements and the forces that occur. With respect to, specifically, these lower speed rear impact collisions, because most of the research has been done in that area and we're talking about questions like, you know, if the car's not badly damaged, what does that mean? What implications does that have for the patient, in terms of pain and disability, and for the clinician, in terms of understanding the forces that have been transmitted to the person's body and their head and neck? Or why do we see most people in our clinics who are hit from the rear? Why don't we see the people who actually drive into the people in front? And I think there's been a much better understanding, through many different avenues of research, live volunteer studies, where they'll get live subjects sitting in cars and impact them from behind and they'll have accelerometers on their head and neck so that we can record the head and neck acceleration. And, basically, what's

been demonstrated very consistently is that, even at very low speeds with either no damage to the cars, or very minimal damage, the head and neck acceleration can be enormous. In these low speed rear impact collisions in the studies, they limit the impact usually to around under 10mph. So, the car that's drove into the back of the other car's going no faster than 10mph, often 7mph or 8mph, which is very slow, and then, when that impacts the car in front, the head and neck acceleration of the occupants in the car can be in the region of 12Gs or 15Gs. So, that's G-Force, that's the acceleration measure and that basically means that their head and neck acceleration was 15 times greater than the acceleration of gravity, which means it weighs 15 times more and that occurs very rapidly after the impact of the car into the rear of the other car. So, you know, your average head or neck's weighing 50, 60 kilos. So, the risk of injury is huge even in the absence of damage, and I think understanding that can help a lot, clinically, because sometimes it can be a confusing condition to treat anyway, in terms of clinical presentation, but just understanding the basic kinematics, with respect of the forces involved, can be helpful. So, there doesn't have to be a lot of car property damage for there to be pain and disability.

C: That's so surprising as you say that because, I mean, (a) for me, the speeds are so low, you, kind of, think no damage to the car it's, like, "oh, yeah, a bit of whiplash" but also, with regards to being hit from behind, you… my, I suppose, assumption would be the person who's hitting the back of the other car, you know, they're flung forward, it's the things that you see on the models, it's the head flying forward, it's why we have airbags, and so and so forth, and you'd think that would be more dramatic, almost, and more damaging and you'd need more speed, but that's saying that's not the case?

CW: I agree, I agree. It is counter intuitive how, at these low speeds, you know, you can get injury and it's been consistently demonstrated, as well, that the forces involved when you're hit from behind are three times greater than if you're the person driving into the car in front and this is clearly demonstrated, and I'll show this film at the evening lectures. I've got some film of a live volunteer driving head first into a stationary vehicle at about 40mph and his… obviously, there's huge property damage and, obviously, his airbag deploys, but his head and neck acceleration was around 10Gs, so ten times the force of gravity, and I've got some film of a guy being hit from behind at about 7mph or 8mph and his head and neck acceleration is greater. So, it's about… I think it's around 14, 15Gs. So, it's consistently demonstrated that that's the case, and that's why we see people who are struck from behind, or other directions, rather than those who are driving in front, and I think you have the opportunity to brace, as well, and prepare for the accident, because you can see it's going to occur and I think that the body's mechanics just basically work better when you're hitting an object, you know, in front of you. Not to say it can't lead to injury, of course, but the forces involved are much greater being hit from behind.

C: So thinking, with regards to those forces, then, taking it through to the biomechanics, what have we learnt with respect to that, as to why? Why is this so significantly different, comparative with, you know, flexion based or, you know, the person who is hitting the car in front?

CW: Yeah, I think there's many, again, convergent fields of study which clearly demonstrate the pathology that we're looking at here in whiplash injuries, very likely to be the facet joint and the facet joint capsule is strongly implicated in whiplash trauma, and the reason for that is because of the position the spine goes into during whiplash injury and we've got this fantastic study, an x-ray cinematography study. So, live film of the vertebrae moving that they used in the research, and they were able to see live volunteers' necks, how the vertebrae moved and, basically, the spine adopts an extremely unnatural position. It's termed a sigmoid deformation. So, the s-curves reverse and this leads to a spinning of the vertebrae on top of each other. So, they spin on their own axis, which is very unnatural. It doesn't occur in any activities of daily living and, certainly, you can't make that happen, and this leads to impaction of the facet joint and sheer forces also occur that can strain the capsule. So, this is all happening before the muscles arrive at the party and protect, attempt to protect, and restrict movement. So, it's utterly unique what happens in whiplash and this biomechanical evidence is supported by experimental animal, cadaver, surgical findings, post-mortem findings and mathematical computational modelling studies that all strongly implicate the facet capsule as being damaged following whiplash, and we have clinical studies, as well, where, if you destroy the nerve, the pain nerve, from the facet capsule, then around 70% of whiplash patients get complete relief of pain. So, an awful lot of evidence that the facet joint's damaged and damaged in that way.

C: So, with… and I'm guessing, with respect to the position of the person, is that's… are we assuming, from what you said, these are people looking forward? I'm guessing rotation and other factors like that would play a role in altering that damage?

CW: Absolutely right, absolutely right. I mean, one of the problems with the research is you've got very healthy people, healthy volunteers, who are very fit and have no other musculoskeletal history of problems and they're sitting in a 50th percent… they're sitting in a chair that's been designed for the 50th percentile male and they're sitting, looking straight ahead. And, as you know, you know, when you're in your car, you're looking all over the place. You're leaning and, you know, you're in many different positions and the research strongly suggests, if the neck is rotated, it can double the strain through the facet capsule, and so the likelihood of injury and long term pain is greater if your head and neck is rotated. The position of the head restraint's important. I think something like three quarters of head restraints are at the… incorrectly positioned. So, what happens then, when you're hit from the rear, is that the head and neck hinge over the top of the head restraint and that can clearly exacerbate injury, and being aware of the impending impact, as well. If you can brace and prepare for the impact, you'll have less head and neck acceleration, so it will reduce the risk of injury. So, all these factors are important and all important things to ask in the clinical setting, to try and build up a picture of what's happened to the patient's head and neck during the accident, you know.

C: Yeah, I mean, with… I mean, obviously, one of the disadvantages of a call is you can't see those, you know, the live films and, you know, demo of head restraints, and so on. There, I'm guessing, things that we're going to expand on at the evening, using the opportunity there to show the videos and we can, kind of, you know, have some models and people doing things, would that be right?

CW: Absolutely right. I mean, one of the things I would say, when people have viewed this film, and I've demonstrated it to lawyers or healthcare practitioners that mainly lecture to physios, obviously, when physiotherapists and osteopaths, chiropractors see this film, they do groan when they see the slowed down film of a whiplash injury, you know, simulated whiplash injury with a live volunteer, because it does look so awful when you slow the film down, and I think it's a really important experiential piece of learning to undertake because you'll understand with much more depth, then, that actually, this is… you know, can be quite a nasty injury.

C: There's two things that come into my mind as you say that. The first thing was something that you said earlier about the healthy volunteers for whiplash studies and I'm just thinking, if someone said to me, "Would you like to volunteer to crash into the back of me at 40mph"? It's, like, the answer's, "No".

CW: No, I'd say, "No", as well, yeah, but all these people got injured. I mean, you know, they got injured for a week and they got very early treatment and, you know, they were very sore and in a lot of pain, even at these very low speeds.

C: I mean, it's great for a better understanding, but it does raise the question, "Why would you do that"? But anyway, the second thing was where you said about health professionals see the video and they groan. With respect to pain science, and the understanding of the different factors that impact on the pain that people experience, obviously your beliefs, understanding is important within that, and there was some research that showed that back schools that mechanise injuries in terms of discs and joints and ligaments, and so on, you know, have the power to increase distress or have the power to increase pain. So, with respect to showing those videos, would you see the main benefit is to educate the health professionals, but then you'd temper the language that you would use with patients with respect to that, i.e. not Catastrophizing it, saying "Oh, it's awful, the things that happen. It's completely unnatural this reversal of the S curve Is that—

CW: That's absolutely right. I mean, obviously, when you're talking about a specific aspect of any injury, you know, it's easy to misrepresent and come across quite unbalanced, but I think it's very important to address that, what you've just said, and, of course, you know, as clinicians, we can look at this material. It's about understanding the mechanism of injury in more depth, and it's as simple as that but, obviously, you very cautiously take that into the clinical arena and, obviously, you know, the studies that have been done on fear of movement and fear of re-injury, when that's treated in whiplash injury, just digressing for a moment, the outcomes are looking to be absolutely amazing, really, and there's been a few studies done very recently. So, just to, you know, to digress and just to show that, obviously, it's incredibly important not to, sort of, you know, go down that road of just scaring the hell out of patients.

C: So, you mentioned, when you talked about the pathology, you then started to mention with respect to… excuse me… when you were talking about the pathology, you started to infer towards the clinical examination and I know some of the things that you've developed through your reading

and through your practice is there's certain things that you're keen to explore in patients with respect to hands-on techniques. Is that something that… what are the sort of things that you'd be exploring on the evening? What are the sort of things that are key for you?

CW: Well, one of the things that struck me, as I've been reading the literature on whiplash, is the fact that the facet capsule, the collagen fibres, appear to get deformed following whiplash injury and there's a great parallel with something as simple, or something that appears more simple, it's the medial collateral ligament of the knee and a sprain there, and we would treat that using hands-on transverse frictions, cross-frictions and there's been some wonderful studies done looking at electron microscopy of damaged ligaments with and without treatment and I'll show the slide on the evening. It's one of my favourite slides, it's incredible. The untreated ligament at four weeks just looks like spaghetti. It looks weak, it is much weaker and its ability to withstand loading is much, much less compared to a healthy ligament, but a ligament that's been treated at six weeks looks much, much healthier. The collagen fibres are much more organised, more parallel organisation. So, it's a really good, strong visual message of the fact that, you know, hands-on work can make, you know, the substance made these ligaments much stronger, for starters. So, I think that research is very important. So, if we're translating that into the whiplash setting, we think the facet capsule is damaged in some way. Then, first off, it would be very useful to palpate that deeply, underneath the posterior muscle bulk, the cervical spine, try and get down onto the facet joint and, obviously, in the acute stage, it's going to be very, very tender. So, you need to take care and respect the patient's level of pain and irritability, etc. But then it also… the research, obviously, strongly suggests that maybe we should then start employing some transverse deep frictions in order to stimulate fibre blast generation and build up stronger collagen fibres and try and, in a sense, repair the damage, if we're looking at this from a very structural, sort of, no susceptive driver point of view. And I think there's a good theoretical basis for that. The approach I use, I term facet frictions, and certainly, clinically, it seems to have some utility, yeah, in patients, specifically following whiplash. I use it with a number of neck pain patients, as well, but building up to maybe a good 10, 15 minutes treatment. Again, if the person's not, you know, not experiencing high levels of pain, etc, and it appears to be more of a mechanical presentation to their… following their whiplash injury. So, it's something I'll demonstrate on the night, you know, and I find it a very, very useful technique.

C: And with… I mean, when we've spoken before, with respect to that demonstration, the goal on the night is to have a, you know, a camera that we can project up so that people can then see and then have questions about what are you doing there? Where are you going? And so on, so it gives people, whilst they're not necessarily doing it themselves, the goal is to see you doing it, hear your reasoning. And, just as a point, I guess, where you've said about… calling that facet frictions, other professions have a different name for soft tissue techniques and, essentially, what you're saying, what I hear, is that you're addressing the soft tissues, you're treating the facet joint capsule as a soft tissue. So, whether that be soft tissue or myofascial release, soft tissue massage, you're saying frictions. It's all, basically, treating that localised tissue that has been damaged, that is then going to fibrose, and it's giving it the best chance for recovery.

CW: Absolutely, yeah, spot on. Yeah.

C: So just to, sort of, draw us to last point of something that I know you were keen to discuss, would be the sensory motor impairment side of things. Obviously, the assessment of… and, you know, to just start talking about the treatment, but this is something that has… is newer, in terms of our understanding. Would that be right, or is that just people—

CW: Absolutely, yeah. Yeah, I think you're absolutely right. I think it is relatively new, yeah. I think the last, sort of, five years, maybe five to seven years, a lot more research has been published on this aspect, again, from the University of Queensland and it's an absolutely fascinating area and people thoroughly enjoy this aspect of the course when I teach it, and it's very practical. It's very, sort of, rehab orientated stuff, very relevant to our practice, yeah.

C: Just as I mentioned to those that are listening, where Chris says about teaching it on the course, that's slightly different to the evening lecture. Chris also teaches a two day course which, obviously, expands on a lot of the topics a lot more and it's a far smaller group, and so on. So, just that reference there, which obviously there's… oh, dear me, my chair's just fallen off [laughter]. Hang on, I've just got to say that again, Chris, so I can edit that bit out.

CW: Get on the floor.

C: I know, my chair's just—

CW: I'll get on the floor, as well. I'll get on the floor, as well. Are you on the floor, yet?

C: No. Yes, yes [laughter]. Right, composure, composure… So, when Chris just mentioned there about teaching that on the course. Chris also teaches a two day course on this, which expands on each of these topics and, obviously, the clinical examination and other areas within that. Some of those will be touched on, on the evening lecture, but just so that people are clear but, with respect to the techniques, and so on, the one thing… the aim on the evening lecture is to explore some of these with Chris demonstrating them, so that people can get an understanding of that. So, sorry, Chris, with respect to the sensory motor, you said about some of the work from Queensland. Briefly, what is it that some of things are disturbed in these patients that are altered you can then address?

CW: Well, let's look at, sort of, the instance of dizziness and unsteadiness following whiplash and, in neck pain after whiplash, some cohorts demonstrate, up to three quarters of the patients will have complained of sensory motor impairment in the sense of unsteadiness, light headedness, dizziness and one third, or 30%, of atraumatic neck pain. So, they haven't had a whiplash but they've got some neck pain, will complain of the same unsteadiness and dizziness. So, it's something that can go, sort of, unnoticed in the clinical setting if you don't ask about it, and people don't tend to link up the fact that they've actually started feeling a little bit dizzy and they've had this whiplash injury. So, it's subtle science and, even in the absence of someone saying, "Yes, I do feel dizzy. Yes, I do get some unsteadiness or light headedness", you often pick up, when you test the sensory motor system, as

we'll describe in a moment, you often pick up and bring on some dizziness and unsteadiness. It's almost like there's a sub-clinical picture there that will sense your motor system is impaired. So, it's a fascinating area to work in and the bottom line is, before we discuss it, is that when you find areas that are impaired, essentially motor wise, so we're looking at proprioception of the head and neck or eye movement control, or postural stability, when you retrain those areas, it improves pain and disability levels. So, it's a really, really useful adjunct to any other, sort of, manual therapy approach, rehabilitation approach. And the three areas that they look at are… and that have been researched are proprioception of the head and neck. So, the simplest way to assess that is to attach a laser to the head and ask the patient, basically, to try and reposition, from the starting position, maybe perform a left cervical rotation, and try and return back to their starting position with their eyes closed. So, it's repositioning the head and neck in space and, 99% of the time, they won't return back to their starting position. There'll be an error. They'll over-shoot or they'll under-shoot and that error's usually in normal, healthy controls. It's roughly around four centimetres if you're 90 centimetres from your target. In whiplash patients, it's usually greater than five or six centimetres and it's usually quite chaotic and it's usually much larger errors than that. So, this control of the head and neck, so the information that the patient's getting from the spindles is somehow distorted, and that's what produces the errors in proprioception and purely retraining that. If there is an impairment in that, and patients love using lasers, it's goal orientated, it's fun, it's interesting, it's different, it's novel and, when that improves, their scores improve. They also notice improvements in pain and disability levels. The other area we look at is eye movement control. So, ocular motor testing, and the simplest way to assess this in the clinic is to ask the patient to follow… either you hold a pen in front of their eyes and move it side to side, so it's smooth pursuit testing. Move a pen very slowly and they follow the pen moving left to right, and it's been clearly demonstrated in whiplash injured subjects that they can't keep up with a slowly moving object. They can't keep up at the same speed and, indeed, they'll demonstrate fast, quick catch up movements of the eye and these are termed 'saccades' and you don't want to see a saccade when you're asking the person to smoothly follow a moving object and, when they perform these saccades, these quick catch-up movements, you'll see that, that the eye will move. It will almost flick very quickly and they will feel a little bit dizzy at that moment in time. So, you're picking up disruption, again, probably arising from the muscle spindles of the neck via a neck reflex, termed the cervico-ocular reflex. So, the connections between the muscle spindles of the neck muscles and the eyes, the eye muscles. There's distorted information going into that reflex network. You get a mis-match of information and the brain, for a moment there, doesn't know what to do and it produces dizziness, and that's why we test the ocular motor apparatus, and there's different ways to assess it. That's putting it very simply, but this is absolute gold dust from a rehabilitation perspective because, again, if you retrain this eye movement control, and you can do it to a very high level dependent on the patient's requirements. Obviously, in the sporting field, there'll be much higher levels of rehabilitation required. It improves pain and disability levels again, and that's been demonstrated in the research. And the final area you look at is postural stability. So, it's just, you know, can someone stand a comfortable stance with eyes closed, eyes open? Can they do narrow stance with feet

together, eyes open, eyes closed, or tandem stance, one leg stance, eyes open, eyes closed? And they're often impaired. They're swaying more in these positions and that's been demonstrated in the research. So, these three areas, proprioception head and neck, eye movement control and postural stability, I see them all as one, essentially, motor impairment and training those improves pain and disability. It's a fascinating area to study and look at, yeah.

C: Yeah, well, I mean, as you said that, I was, kind of, making links between the two because when… we've spoken before, obviously, and when you've spoken before, you said about… we've talked in terms of proprioception, postural stability and ocular motor and it's just interesting, there, you said about the proprioceptive, then you put the ocular motor and, as you were talking it through, it was, like, the postural stability almost, for me, then was, well, it's so obvious that that, you know, disrupted and it sounds a silly thing to say but, suddenly, it was, like, gosh, they are so intricately linked and, for me, whatever it was, talking about them in that slightly different order and, as you said, it was, you know, there's clinical gold dust in that because, from a manual therapy perspective, you can understand how that can feed in, in terms of improving neck function but, as a topic, it was certainly not something I was… never taught in my undergrad and I did my Masters a number of years ago and it was never mentioned then. So, for people that are new to that, there's… as you say, there's clinical gold dust in there.

CW: Yeah.

C: Unfortunately, as is always the way with these things, time is getting the better of us. I know, from when we discussed this before, one of the key things that you wanted to put across during this time was the practical points that there are to use within practice. There are… both within hands-on, both within integrating the theory to help people improve their assessments and understanding of patient presentations, but also some of the other things that are no quite so hands-on, but from the sensory motor side, that people can start applying because, for you, it's… there's a real passion for getting this information out there for better clinical outcome, would that be—

CW: Absolutely, yeah. Absolutely, I feel really strongly about that, yeah. It really… it raises the bar, in terms of our, sort of, clinical effectiveness, yeah, absolutely, and it's skilled work, you know, particularly the sensory motor stuff. You know, you need to have a really in-depth understanding of why there's a problem in these areas and what you can do to improve that clinically, yeah. It's a really fascinating area, but yeah, my passion is to just try and, you know, improve the patient's lot, I suppose, yeah.

C: Because it was… because the one thing that, again, sticks in my mind, from when we've spoken before, is the statistics on whiplash are just astounding in respect of… from that point. The exact statistics from when someone having a, in lay speak, whiplash further down the line, was it three… was it tripled your chances?

CW: That's right, yeah. I mean, one of the things that absolutely shocked me, when I started looking at the literature, was that there's very good evidence that whiplash injury will triple your chances of future neck pain, of persistent neck problems, and that's been replicated again in a more recent study, and these are good quality studies. Seven years in the initial study, after the whiplash injury, so they've got the compensation if they were going to get anything and it's the highest… strongest etiological risk factor for future neck problems, yeah, and I think that this kind of assessment, the sensory motor assessment, is absolutely key, because I think it's possibly disrupted in patients and that's why they would be getting ongoing pain problems, because they've lost control of their head and neck and we've got a huge role to play in preventing that recurrence. Something that can't be done by screening over the telephone, you know, as is the trend these days, hands-off stuff, yeah.

C: I think you would have heard, as you were talking there, there were times when I was going, "aah, aah, aah", because I've got a whole host of questions written down there, but we haven't got time to answer, but I would hope, then, that other people that have engaged and listened to this will be thinking, "Oh, I want to know about this, I want to know about that". So, we will let people know, obviously, with respect to the evening lectures and, of course, your courses and the main thing, as I said at the start, Chris, I really appreciate your time today, just to explore this and just start to get the grey matter thinking and to excite us about the topic, because there is so much more and, for those that specialise in these areas, you bring, obviously, the wealth of knowledge, you know, that you've learnt from papers. I know you've read tonnes of text books, and so on, just trying to draw the different research angles together into something that's clinically applicable.

CW: Yeah.

C: I really appreciate that. Thanks so much, Chris, and—

CW: Thanks very much, yeah.

C: —I look forward to hearing your evening lecture and, of course, for those that… oh, dear, I've just… hang on. I leant forward. I've got to say that last bit again. [Laughter].

CW: Are you all right.

C: Yeah, I am. I'll tell you about this chair in two seconds. So, let me say that again. So… hang on... yeah, so those of you that are interested, obviously, in Chris' courses and, with respect to the dates of the evening lectures, we'll let you know. So, thank you for your time and I'll speak to you soon. Chris, thank you.

CW: Thanks very much, Chris. Thanks, bye.

Notes

PHYSIOUK

020 8394 0400 | info@physioUK.co.uk | www.physioUK.co.uk