

IndyCar Media Conference

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Dr. Terry Trammell Howison Schroeder Dr. Geoffrey Billows Press Conference



THE MODERATOR: We have a really exciting and special press conference today. This is obviously the world of dealing with head trauma and concussions and so forth, it's a big topic in all sports today. We have three leading experts in the efforts to diagnose and treat not only drivers but people who have been concussed.

I'd like to introduce to you INDYCAR's medical director, Dr. Geoff Billows. We have Dr. Terry Trammell who has obviously been a leading safety consultant, had a variety of roles with Indy car racing and Indianapolis Motor Speedway over his career. In the middle we have Howison Schroeder, who is of the president and CEO of Neuro Kinetics, which will be a key part of today's discussion.

I want to start with Dr. Trammell. If you could talk to us today, an overview of INDYCAR's concussion protocol, then tell us about the device today that we're going to talk about that should be a real difference maker, you've even called it a game changer, for the process of treating drivers and diagnosing their situations.

DR. TERRY TRAMMELL: We, IndyCar, have been on the forefront of concussion diagnosis and prevention, really concussion prevention, for a long time through design changes in the racecar itself that have come about over a long period of time, to make the head and surrounding environment safer and more protective for the driver. We still have had some head injuries and concussive phenomenon in the past. The issue turns into how best to make an accurate diagnosis.

It's important to understand that that always begins with a careful physical examination and observation of the driver. Information from the safety team on the racetrack, the physicians present on the racetrack at the time that the driver is reached, that information becomes critical to be able to start the process for making a diagnosis of concussion.

Concussion is an event, it's not an entity. The entity is a mild traumatic brain injury. We have to have an event to generate that. One of the ways that we are able to analyze that event in the cases where the driver has a more subtle expression of a concussion, the mild

traumatic brain injury, is utilizing the sensor data that's in the car. The car chassis has an accelerometer that measures chassis Gs in a crash. The driver has ear accelerometer that measures head accelerations during the crash. Over the last several years we've tried to correlate that information with clinical findings of a concussion.

We have an index of suspicion, as it were, that says, Okay, this driver has a high index of suspicion for concussion. That's roughly based on some G parameters. Everybody is a little bit different, but it would be very, very unusual, and we have not seen, a concussion with head Gs of less than 50Gs. Anything over 80 is worrisome.

In those cases where a driver may not exhibit clinical findings of a concussion immediately, we look to other ways to test the driver to see if there's something different that will pick up those subtle changes.

One of the classic things has been impact, which is a test that's taken on a computer that the driver does during physicals pre-season. Then if they have an event like this, we can repeat the impact test and see if it's changed. But we're looking for a change.

The advent of the Neuro Kinetics device is a battery of tests that are able to help us understand certain neural pathways that have been altered or are behaving out of norm. It's the test that we use.

The best analogy I can give you, where this has changed the game is compare this to cardiology. A number of years ago, like in the 1800s, the stethoscope was invented in 1860, and that allowed a physician to actually listen or osculate the chest to hear the heartbeat and hear rhythms of the heart, so on and so forth. A number of years later, like 1903, the first EKG machine was invented, won the Nobel Prize in 1924. That was a game changer for cardiology. It gave an objective test that allowed the physician to look at a tracing, a graph, and correlate that with clinical findings for heart disease, heart attack. You could still have a heart attack and not have it show on an EKG, or you could have EKG changes that said you have a heart attack but weren't having one.

That's where we are now with the i-Pass system. It's a battery of tests that allow us to correlate our clinical suspicions with an objective measure. It's not gameable. It measures the ocular motor, eye motor,

and reaction times so that we get some objectivity to that. There are enough tests that have been done across the board that they're normals for population. Those normals are constantly being updated. Actually, we INDYCAR drivers have created some new normals for some of the reaction time tests because we're so fast. That's kind of where we stand with it now.

THE MODERATOR: We're talking about it's called the i-Pass system, but this is essentially a goggle test that's going to track the eye movement. If you want to show what this goggle system looks like. It feeds a computer and the driver experiences a series of tests, 11 of them as I believe, maybe 14, but there are a series of tests which provides an objective look at what's happening with the driver's head.

DR. TERRY TRAMMELL: Correct. The test subject puts these on. When they do that, this harness is connected to a laptop computer. It generates data. I'll show you the graphs here in a minute. What the testing person sees are the person's eyeballs, the whites of their eyes, the pupils, the iris and so on. So you can see the eye muscles contract, get bigger and smaller. Think of going to the doctor, he said, Follow my finger back and forth, follow it into your nose, back out of your nose. This does that, but it does it optically. It's very, very sensitive. It measures the changes in your eye very accurately, to infinitesimal small degrees.

That gives us an output. From that output, think EKG, I'll grab one that's kind of dramatic. It gives a printout, or we can print it out. It does that for each test. Each test may have two or three different graphs that come out of it.

With utilizing that data, coupled with the clinical exam, we can come up with a diagnosis. The doctor still makes the diagnosis, the machine doesn't make the diagnosis. But back to the EKG analogy, we now actually have numerical data that isn't dependent on the subject's behavior, providing they can cooperate with the test. They can't game it. There's nothing you can do to change your physiology, it just is. That's the real value. It's very subtle.

Where this becomes the real game changer is we have somebody that has a fall on Sunday, Monday they call up and say, I don't feel quite right, something's not the way it was on Saturday. They may not have signs of a clinical concussion based on what we've used in the past to make that diagnosis because the changes are subtle. This just gives us a battery of more specific tests to use in our clinical evaluation.

THE MODERATOR: Dr. Billows, if you could give us a little bit of history. You were introduced to the system, this has been used primarily or the origins came from the military. It landed as a development piece at the University of Miami. So a couple years ago you had an incident which led you, how you've taken it to the point

of now all your drivers for this year's race have undergone a concussion test ahead of time just to see where they stand.

DR. GEOFFREY BILLOWS: Sure. ^ we did have an incident several years ago, the 2016 season, in which one of the drivers had a very minor incident on the track, the following day developed some symptoms. He actually decided himself that he would not be able to drive.

We went and took a look at him and evaluated him. His symptoms were significant enough that his performance was really impaired to the point that we felt that he was having concussion-like symptoms.

At that point we put him into the concussion protocol. He was then sent to the hospital for more sophisticated testing. Ultimately he had an alternative diagnosis. That's fine. In one of the tests he had in the hospital was the i-Pass goggles. When drivers are having symptoms, when they have symptoms that could possibly be a concussion, we would rather err conservatively and place that driver in a concussion protocol, ultimately it's determined that he had an alternative diagnosis, that's fine. We would rather have that happen than to send a driver back out on the track that has a concussion. We don't want to miss a concussion. The results of that could be devastating to both the individual and the other drivers on the track.

So part of the protocol that he went through at the University of Miami was the i-Pass goggles. Again, he ultimately had an alternative diagnosis. That's kind of the way the concussion protocol was designed.

Since then, we have taken a look at the system. We began in the 2017 season testing some of the drivers. This year I think we have tested all of the drivers in their annual physical evaluations so that we have baselines on all the drivers.

The interesting thing about this device, as Dr. Trammell mentioned, you can't game it. They potentially do poor on their baseline so they can look better if something happens. Part of the SCAT test that we use is self-reporting. Drivers have to self-report symptoms that they're feeling. They may or may not be forthcoming in self-reporting.

I think the benefit of this device is, again, it doesn't replace anything we're already doing, it's another tool, another piece of the puzzle. It will help us, I think, detect concussions in patients as Dr. Trammell mentioned that have very subtle findings. We do see that. People call us the next day, I feel foggy, not processing information well. We can bring them back and test them on the i-Pass.

The one problem that we have is through the years the design of the cars and the personal protective

equipment has come to the point where it protects the driver so well, we have very few concussions actually. Very, very few head injuries. We did have a head injury a few weeks ago in one of the Pro Mazda drivers down in Alabama when we were there. Based on just his clinical exam, he was significantly concussed and went to the hospital. Came back here two weeks later, and we tested him with the goggles. We could see exactly where his problem had been, that he was where he should be two or three weeks following his concussion.

THE MODERATOR: One of the amazing aspects is the amount of time it takes to conduct this test. You can have this test in about eight minutes depending on how quickly it's administered, more so than how quickly the patient can take the test. It's important that you have the tools to make the right decision in a very short period of time.

DR. GEOFFREY BILLOWS: Correct. When we first started doing it, it was more like 20 or 30 minutes. Now that we're more comfortable with it, we've had more experience with it, it's about eight to ten minutes. Not very long.

THE MODERATOR: Mr. Schroeder, can you talk about how this impacts -- how INDYCAR's role has been really unique in the people that you've had a chance to reach out to and what you've seen from other sports organizations, the leadership at the table, the commitment INDYCAR has made.

HOWISON SCHROEDER: I'd be delighted.

We've all seen a lot of technologies that have been out there, putting themselves in the headlines. We have actually not put our scarce dollars into much of promoting headlines. We've put our time and efforts into the science and the engineering so that we had something that was precise. The basic just is, can we actually measure the neurofunctional signals of the brain. The answer is yes.

Let me back up a little bit. Professional sports obviously headlines everywhere concerns about concussions. But nobody really quite knows what to do about concussions. INDYCAR has in my experience been the first professional sports organization to take a lead in concussions. Partly maybe it's a little less risk to them, as Dr. Billows said, not a whole lot of concussions here. Good heavens, two people going down the road at 200 plus miles an hour, the millisecond decisions you have to make, if you're not right, you make a mistake, you might not only hurt yourself badly or kill yourself, the person next to you, the fan or a spectator.

I think it's impressive that INDYCAR has chosen to take this lead and promote what I believe, I could be wrong, but I believe this is the first significant addition to a concussion protocol in a pro sport in the last 10,

15 plus years. We're just ecstatic, flattered, honored, to be the ones that have been able to cross that Rubicon.

THE MODERATOR: Dr. Trammell, you make the point, I'll borrow from another opportunity, that in our system we are innocent till proven guilty. In your concussion analysis, it is almost the opposite. Tell me more about that.

DR. TERRY TRAMMELL: Well, obviously we have a strong feeling that we can't miss a concussion. As Dr. Billows put out, if we're going to err, it's going to be on the side of safety. If it risks the driver's health, in our opinion, to let him drive then that's too bad, I mean, but it's the safe thing to do.

What this does, I'll give an anecdotal example, we had a driver at Texas last year who had an impact twice, hit the outside wall, came across and hit the inside wall, both times a little over 50 head Gs. When he was evaluated in the infield care center, he made the comment that he felt like he'd had a glass of wine, he was a little woozy. Okay, that's it, pull the chain. You've triggered your concussion evaluation.

Took him aside, did the basic SCAT stuff, which he passed well, except the balance part was a little off. Then we did the goggles. He was normal, hadn't a change from his previous deal. It turned out he was a little bit woozy, a little bit out of balance because he was dehydrated. We gave him a few of these, he didn't need the glass of wine any more. Maybe he needed the glass of wine, but didn't feel like he had it.

THE MODERATOR: Questions.

Q. Obviously from what little we know about concussion, non-medical people, not enough, does this test pick up the gradual deterioration that people have after a series of concussions?

DR. TERRY TRAMMELL: We're in the process of doing a study with our drivers that quasi answers your question. We're taking all of their tests from 2017, looking at every driver in that test group that had an impact of greater than 50 head Gs, and then looking at their current test to see if there are any subtle changes anywhere in the line of the testing.

You have to understand that some of these tests are multiple layers of answers beyond my capabilities right now of knowing that. There is some clinical application that perhaps Mr. Schroeder could address better where it is being used to follow people actually the other direction, to see if they're improving. We've used it to see if a driver is improving, our recent Mazda driver, we were actually able to see he was recovering from a concussion.

This does tell you if you've had one. Concussion leads a scar, so to speak. There are parts of the tests here that will become -- they don't really diagnose you've

had a previous concussion, but they're consistent with that scar.

Did I say that right?

HOWISON SCHROEDER: I think you did. If the eyes are an extension of the brain. Actually, there are eye neurons in virtually every part of the brain. Each one of these parts of the test, takes a different neural pathway. Again, we're going to see these deficits. We've done some longitudinal data, this is actually a great opportunity. We've worked very closely with the University of Miami, Dr. Hoffer. He is the one that got us introduced to Dr. Olvey, and Dr. Olvey into these guys. He's been a phenomenal supporter for the cause of science. He has no stake in this whatsoever.

He and his colleague published a paper not long ago looking at the longitudinal tracking using this ocular motor vestibular reaction time data over about two and a half weeks. You can see who got worse, who gets better and who heals. To your bigger question, we've got anecdotal experience seeing people that have played rugby, other sports, where the cumulative effect of these concussions, you can see. We don't have enough data to say and correlate it.

This technology, and thank you Dr. Trammell for the term 'game changer'. Being able to measure the brain's performance this way opens up a phenomenal whole field of opportunities in looking at this brain health data. Concussion is just this big, huge, unsolved so subtle, particularly mild concussions, you need finally tuned precision technology to track it. If you can find a few extra millions for us, we'd be able to study this stuff and see what it looks like.

Q. Dr. Trammell, with all your experience in concussion treatment, all the data you have, from my personal standpoint it's quite important that you have cooperation with helmet manufacturers and HANS devices to lessen concussion. Is there any cooperation with helmet manufacturers?

DR. TERRY TRAMMELL: You're asking if there's cooperation between different sporting organizations or...

Q. Helmets.

DR. TERRY TRAMMELL: That's hard. There is one in particular that has spent a great deal of time and effort that I'm aware of to bring a helmet to youth football utilizing information not from this because we didn't have it then but just our medical thoughts on concussion.

Just briefly by way of background, the right question is, what is an orthopaedic surgeon doing talking about concussions? The answer is, first of all, the American Academy of Orthopaedic Surgeons say we have to know about it because most sports medicine doctors are orthopedic surgeons.

The second part of that is about 15 years ago I got recruited, polite way to say it, to be one of two team doctors for the original Naptown Roller Girls roller derby team. Because they play on concrete, on a flat track, we have concussions daily. I mean, every practice we had a girl with a concussion. I didn't know anything about it at the time other than what I read in the journals. I was forced into learning about this for that. Are, not any of this for racing, it was all for my roller derby girls.

That led to a number of changes in the league that they play in as far as concussion awareness, but also in the helmets. We evolved them to hockey helmets because the hockey helmet makers have figured out that they needed to do something about concussions.

The actual interchange is not as clear as maybe it could be or as utilized. I think that addresses your question.

THE MODERATOR: You tested four drivers this year?

DR. GEOFFREY BILLOWS: We have four episodes in the INDYCAR drivers that were potentially concussed that we wanted to do an evaluation, they were all negative.

THE MODERATOR: Which really speaks to the safety element, the headrest, the whole package you talked about at the start.

Gentlemen, thank you for this.