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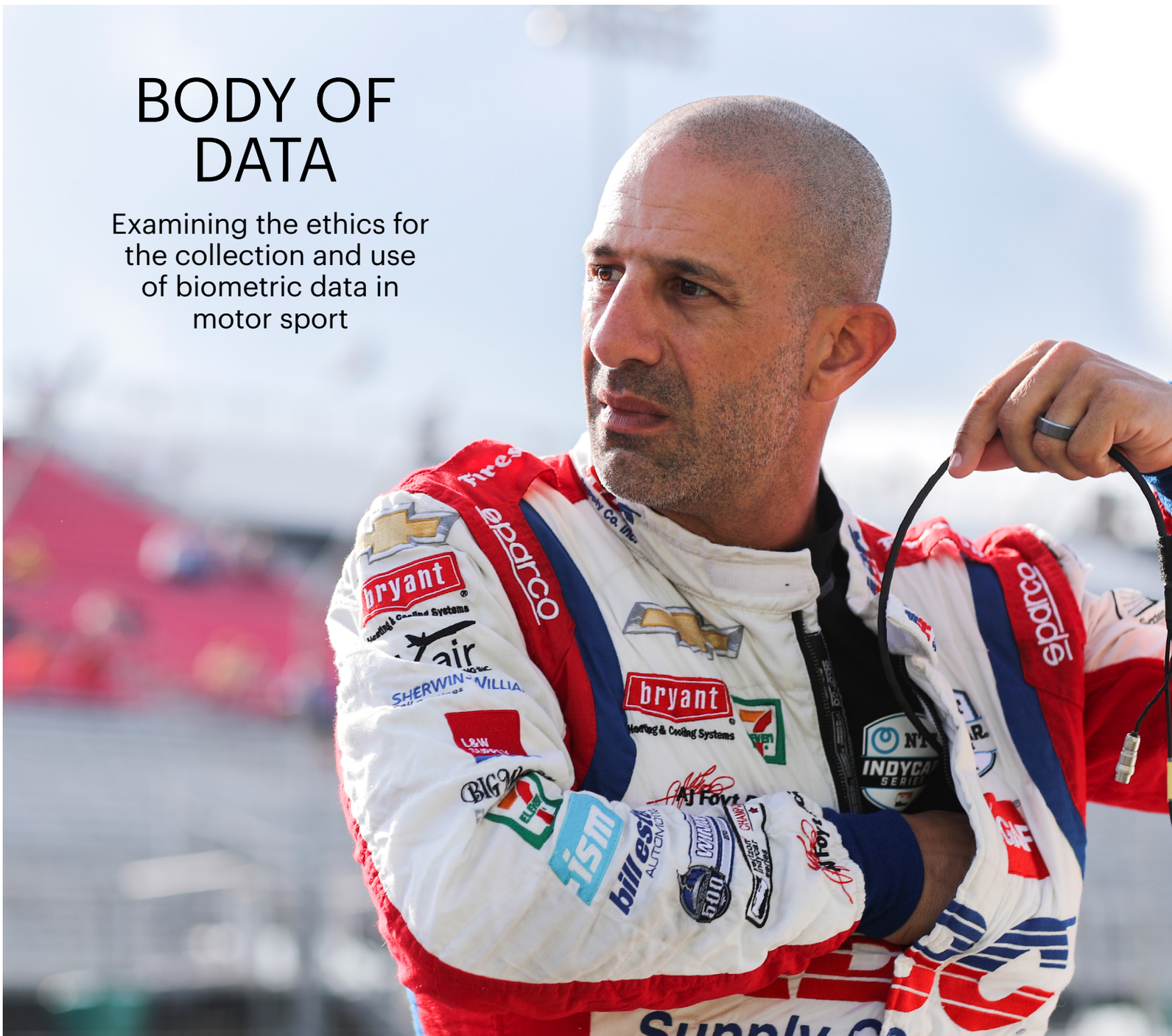
AUTO+ MEDICAL

BODY OF DATA

Examining the ethics for the collection and use of biometric data in motor sport



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INTRODUCTION/

In a reminder that we must never become complacent about safety, we have seen several serious accidents since our last edition, with the tragic death of Anthoine Hubert and life-threatening injury of Juan-Manuel Correa. We are sure you will join us in offering our sympathy and thoughts to all those involved and affected by this terrible accident. It would be inappropriate to look at any of the details at this time, as obviously extensive investigations are being undertaken by the FIA and appropriate authorities. Juan-Manuel Correa is now out of hospital, after being transferred to London UK for Extra Corporeal Membrane Oxygenation (ECMO) appears to have been used with great success. ECMO is being trialled in major centres for pre-hospital use and was discussed at the FIA Chief Medical Officers summit in St Petersburg last year. As far as we are aware this is the first time it has been used in a motor sport related injury. In yet another accident, the Formula 3 car of Alex Peroni was spectacularly launched into the air after hitting a kerb. Diagnosed with concussion and a fractured vertebra, he now has to rest for some months. All of us at *AUTO+ Medical* would like to wish Correa and Peroni a speedy recovery.

Elsewhere in this edition we look at the shortage of marshals and volunteers, which is affecting some areas of our sport, and Scot Elkins discusses his role as race director of Formula E and his views on safety.

Acknowledging the collaboration on safety announced between the FIA and FIM, we look at the Safety Car used for MotoGP, which will be familiar to some who are involved with both four and two-wheel motor sport.

As always please get in touch with any ideas, comments or suggestions, we are always pleased to hear from you.

The Editorial Board

GLOBAL NEWS

WATKINS SCHOLARSHIP TO OFFER ROLE IN FIA SAFETY DEPARTMENT

Applications are open for the Sid Watkins Scholarship 2020, an initiative established in honour of the safety pioneer.

The winning candidate will be able to contribute to important safety research across all levels of motor sport, from Formula One to karting. The scholarship is jointly funded by the FIA and FIA Foundation, and will be a role in the FIA Safety Department for the first time.

Formula One Managing Director Ross Brawn, German Motor Sport Federation Medical Director Michael Scholz and FIA Safety Director Adam Baker, are among the panel of experts that will select the winning candidate.

The successful applicant will have the opportunity to conduct research and engineering projects at the FIA's head office in Geneva.

"This is the fourth time we have awarded the highly coveted Watkins Scholarship, but the first time the role will be directly within the FIA Safety Department," said FIA Medical Commission President, Gérard Saillant.

The last winner of the scholarship was Dr Naomi Deakin, who is a Clinical Research Associate in the Department of Neurosurgery at the University of Cambridge, and became the first doctor to win the scholarship. Deakin has since launched RESCUE-RACER, the largest concussion survey which aims to establish guidance for when competitors return to racing.

•*For further details click here, and to apply, email: safety@fia.com.*

AUTO+MEDICAL GLOBAL NEWS

RICCIARDO TO HELP DEVELOP BRAIN TECHNOLOGY

Neurotechnology startup MindMaze has announced that Formula One driver Daniel Ricciardo will help develop its brain sensing technology.

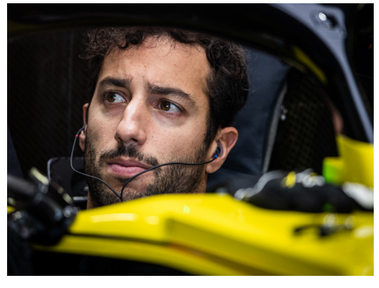
The Renault F1 driver will join as a brand ambassador to help advocate for safety in motor sport, helping them develop technology that will be used for driver performance tracking and emergency medical response.

"We are never too far away from danger in motorsports," said Daniel Ricciardo. "With MindMaze's monitoring technology, race teams and medical crews will be able to better understand a driver's condition in real-time."

Earlier this year MindMaze announced a separate partnership with McLaren Racing to design and develop 'MindDrive,' the next generation of safety and performance platforms tailored for motorsport.

MindMaze founder, Dr Tej Tadi added that the addition of Ricciardo builds on their portfolio of helping patients worldwide.

"With Daniel, we hope to accelerate our efforts on using advanced technology for driver safety and performance management," said Tadi. "By tracking bio-signals we will get a better insight into drivers and the race crew in real-time, plus give medical teams critical data on driver wellbeing in the event of a concussion or serious brain impact."



KARTING BODY PROTECTION TO BE MADE COMPULSORY IN 2021

The use of karting body protection is set to be made compulsory by the FIA from 2021, for all CIK-FIA events.

This follows the publication of the FIA Standard 8870-2018, the first karting body protection standard introduced following approval from the World Motorsport Council last year.

The new design is a combined chest and rib protector that drivers can wear under their race suits and can protect them against three forms of injury: impact with flat or curved structures; impact with the steering wheel or edge of seat; and impact with steering column.

Products manufactured to this standard will be recommended up until December 2020, and then from 2021 they will be compulsory.

FIA HOSTS MEDICAL AND RESCUE WORKSHOP IN RWANDA

The FIA recently held a regional Medical and Rescue Workshop in Rwanda, which hosted 24 delegates from 12 National Sporting Authorities (ASNs).

Delegates representing Madagascar, Mozambique, Côte d'Ivoire, Nigeria, Namibia, Tanzania, Botswana, Erythrea, Zambia, Kenya, South Africa and Uganda were present to discuss a range of topics relating to medical and safety in motor sport.

This included accident investigation, data protection, rescue tools, and updates to the FIA Safety Department alongside the Medical and Rescue Group.

In the afternoon there was a focus on regional activities which was joined by Safari Rally Chief Medical Officer, Dr Raj Jutley. He was on hand to discuss the organisation of the medical and rescue teams for the

event, which takes place in Kenya next year.

"It was great to host various delegates from across the African region in Rwanda," said Dr Pau Mota, FIA Head of Medical and Rescue. "It was important for them to be given an update on various medical and safety related topics, and to discuss activities in the region including the Safari Rally."

PERONI RECOVERY PROLONGED AFTER MONZA F3 CRASH

Alex Peroni has been forced to sit out the remainder of this year from the racing calendar, after his spectacular crash in Monza during an FIA Formula 3 race.

During the second F3 race of the Italian Grand Prix weekend in September, Peroni ran wide on the exit of the Parabolica and was launched into the air after hitting the sausage kerb on the outside of the corner.

After rolling in the air the car landed upside down on the tyre barrier, before righting itself on top of the catch-fencing at the exit of the corner. Although he emerged from the car without assistance, Peroni was later diagnosed with fractured vertebra.

He was later advised by his neurosurgeon that another three months was needed for the bone to properly heal, after getting proper treatment in his home country of Tasmania in October.

"I was knocked out during the crash so I don't remember it and that's why I guess I'm not that traumatised by watching it," said Peroni. "I'm very lucky to be walking. I can't wait to get back in the gym and back on the track, but for now a gentle walk is as good as it gets."

"Hopefully I'll be able to go to the pool and do some gentle resistance work," adds Peroni. "I'm so disappointed to have to sit out the rest of the year just when I was heading for my best race result in the championship."

Peroni is still wearing a back brace as a result of the crash, but hopes to get the all clear to remove it before his physical training in December.

Peroni was knocked out briefly when the crash happened

FIA AND FIM TEAM UP ON MOTOR SPORT SAFETY

The FIA will be collaborating with the Federation Internationale de Motocyclisme (FIM), on a number of future safety projects.

The two governing bodies recently teamed up to develop a new paint standard for use on circuits, including track limits, kerbing and asphalt run-off areas.

The new standard defines a number of performance criteria for the paint, including friction properties and visibility under a variety of conditions. The result will ensure the paint used on circuits around the world performs consistently in both wet and dry conditions, reducing the potential for accidents due to a sudden loss of grip.

This is the first of a number of collaboration projects planned between the FIA and FIM, with the aim to work together on a range of research projects related to circuits and competitor safety devices.

"It gives me great pleasure to welcome this collaboration with the FIM on a number of safety projects," said FIA President Jean Todt. "By uniting our two governing bodies on safety, it means we can advance standards for all forms of motor sport worldwide."

"The FIM and FIA share circuits around the world," said FIM President Jorge Viegas. "A collaborative approach to safety standards will not only simplify the process for the industry but will also ensure the highest level of safety for competitors worldwide."

NASCAR DRIVER TO MISS FINAL THREE RACES AFTER SUFFERING SEIZURE

Matt Tifft will miss the final three races of the NASCAR season after suffering a seizure at Martinsville Speedway.

Tifft was at Martinsville preparing for the rookie meeting when he fell ill, then had to withdraw due to a 'serious medical issue' before being transferred to Martinsville General Hospital.

It was later revealed that he suffered from a seizure, although this was not linked to an earlier brain tumour that he has removed three years ago.

"Luckily my test results showed there is nothing there as far as my brain tumor," Tifft said. "My goal is to get back in this race car, and I want to be back as soon as I possibly can, but these next few weeks are going to be dedicated to finding answers with doctors to why this happened."

In 2016 Tifft had successful surgery for the removal of a low-grade glioma in his brain.

FIA LAUNCHES GUIDELINES FOR BIOMETRIC DATA USE

The FIA has published the first guidelines for how biometric data should be collected and used in motor sport.

The new guidelines regulate how competitor-related biometric data can be used in various capacities such as human performance monitoring, medical and rescue, and for marketing and entertainment purposes.

Traditionally, sports teams use biometric data to monitor an athlete's fitness and performance, by looking at their heart rate, blood oxygen level, hydration level, body temperature and other factors. Biometric information is growing in its area of use in motor sport, with medical and rescue teams benefitting from its safety applications both trackside and for post-accident investigation.

These new guidelines detail how biometric information should be protected in all scenarios, to ensure that it is used ethically and does not breach privacy laws. This follows the introduction of FIA standard 8868-2018, which all biometric devices must meet to be used during FIA competitions.

Adam Baker, FIA Safety Director, said: "The use of biometric data has provided great benefit for our continued research into motor sport safety. We are pleased to introduce a set of guidelines that detail how this data should be used, to give confidence to competitors that their data is being handled securely and ethically."

Read more about the new guidelines on Page 12.

FORMER INDYCAR MEDICAL DIRECTOR PASSES AWAY

Dr Michael Olinger, who served as IndyCar's Medical Director from 2006 to 2018, has passed away at the age of 69.

Having been part of IndyCar since the Indy Racing League was formed in 1996 as an on-track physician, Dr Olinger was promoted to deputy medical director following the retirement of Dr Henry Bock in 2006.

In 2014 he was appointed as the state of Indiana's first emergency medical services director and served as the Medical Director for urban search and rescue authority, Indiana-Task Force 1.

A former helicopter pilot in the Army, Olinger was deployed by the US Federal Emergency Management Agency to the Oklahoma City Bombing, Hurricane Marilyn, the DeBruce Grain Elevator explosion, the Atlanta and Salt Lake City Olympic Games, the World Trade Center incident, the recovery mission of the Space Shuttle Columbia crew, the Republican National Convention, Hurricane Frances and Hurricane Katrina.

"Olinger was really the father of EMS here in Indianapolis and truly one of the old guards in our field," said Dr Dan O'Donnell, the Medical Director for Indianapolis Emergency Medical Services.

"What I loved most about Dr Olinger was his demeanor," said former IndyCar driver Mario Andretti. "Quiet, calm, and reassuring. Tremendous qualities for a doctor in our sport. His presence will be missed."

CROSS COUNTRY DRIVERS RECEIVE FIRST RESPONSE TRAINING

Competitors in Rally Kazakhstan, which is part of the FIA World Cup for Cross Country Rallies, underwent first responder medical training to ensure they can provide initial care before emergency workers arrive in the event of an accident.

The training was organised by Kate Robson, FIA Head of Sport Grant Programme and Accreditation and carried out under supervision of Michael Jacobi, a medical car paramedic specialized in motorsport and rally events. It was delivered to around 80 people in a series of topics covering the use of first aid kits and tourniquet, helmet, HANS removal and stable side position, and car extrication.

The incident training was developed by the FIA in partnership with the

International Federation of Red Cross and Red Crescent Societies (IFRC). The two organisations have been working together to create an accredited training scheme for competitors, which will result in participants being granted a level of official recognition from the IFRC Global First Aid Reference Centre.

Cross Country competitors first received the training ahead of the Abu Dhabi Desert Challenge earlier this year as part of the 2020 planned introduction of a new survival kit. Developed by the FIA Medical Commission, the kit comprises basic items such as plasters, scissors, bandages and tape, as well as access to tourniquets and compression bandages to control bleeding, treatment for burns, eyewash and protective thermal blankets.

In 2020, the plan is to further expand the training at Cross Country events.

ICMS WILL TAKE PLACE IN DECEMBER

The 2019 International Council of Motorsport Sciences annual congress will take place December.

A range of topics concerning medical motor sport safety will be discussed. The congress will take place at the Indiana Convention Center, between 11th – 13th December with a focus on motor sport medicine, science and education.

"We are pleased to announce the curriculum and faculty for our Annual Congress," said Don Andrews, Executive Director of the International Council of Motorsport Sciences. "The 2019 Annual Congress will continue to offer practical training sessions and safety demonstrations, this will take place on Friday, December 13th at the Race Track Safety Program."

Last year there was a focus on racetrack design and safety with motor sport legends Al Unser Sr. and Al Under Jr. kicking off the conference by talking about their extensive careers in motor sport.

SUPERCARS USE IN-CAR HAZARD WARNING SYSTEM

Supercars used a new in-car hazard warning system for the Bathurst 1000, which notifies drivers of decisions from race control in the cockpit.

Developed by MoTeC, the system is designed to encourage less reliance on flag marshal points around the circuit. The lights can be triggered either by a marshal trackside or directly by race control, and features warning lights for yellow, red, and blue flags and course conditions.

"If there's an accident across the top of the mountain, it's about getting the information into the cars as quick as we can," said Adrian Burgess, Supercars Head of Motorsport. "If we can save one accident across the top there, or a life, then it's paid for itself."

A variant of the system made its debut at the Bathurst 12-hour race earlier this year at the Mount Panorama circuit, which features blind corners and fast bends.

Supercars believe that the system and the timely delivery of information to the drivers will prove critical in ensuring their safety and avoidance of heavy accidents.

UK'S FIRST DISABLED RALLY EXPERIENCE LAUNCHED

The UK's first rally experience designed specifically for disabled drivers launched earlier this year, headed by FIA Disability and Accessibility Commission President Nathalie McGloin.

Based at the Bill Gwynne Rally School at Turweston Aerodrome, Buckinghamshire, the Spinal Track Rally Experience is the first initiative of its kind, where disabled drivers are given the chance to learn how to drive a rear-wheel-drive rally car.

There is no charge to take part in the Rally Experience and events are funded by Spinal Track, a charity founded by racing drivers McGloin and Andrew Bayliss in 2016 and supported by the Richard Burns Foundation.

The idea behind Spinal Track is to give people with disabilities the opportunity to take part in track driving experiences in specifically adapted cars.

For the Rally Experience, drivers will be able to choose between two automatic Toyota GT86 cars which feature two separate hand controls. One also with a left-foot throttle installed to suit as many drivers as possible, while both cars have bucket seats, harnesses, long travel suspension and a roll cage fitted.

"Until now, Spinal Track has focused its support for disabled drivers around track days and circuit activities," said McGloin. "The new Rally Experience will allow us to diversify our offering, giving drivers the opportunity to freely experience a competition car not just on the track, but on rally stages."

MOTOGP RIDERS CONCUSSED FOLLOWING SILVERSTONE CLASH

Andrea Dovizioso and Fabio Quartararo were diagnosed with concussions, following the MotoGP round at Silverstone.

The two riders were involved in a crash on the first lap of this year's British Grand Prix, after the Ducati ace collected Quartararo's Yamaha on the exit of Copse corner. The contact caused Dovizioso to be launched into the air, causing him to slam into the ground as the pair slid off onto the tarmac run off.

While both riders were able to walk away from the crash, Dovizioso suffered momentary memory loss and had to be transferred to Coventry Hospital for further checks. Quartararo was also sent to the hospital for checks and was later diagnosed with a concussion.

At the following round in San Marino both riders were back, with Dovizioso explaining that he had done some motorcross training ahead of the event after resting at home.

"I remember everything, my memory came back after 40 minutes," said Dovizioso. "Now I feel 100%, I did some motocross training to be sure if everything worked well."

Quartararo explained that it was a loss of grip that caused the incident to take place.

"I'm OK. I'm quite lucky that I haven't broken anything, which is positive," said Quartararo. "If (Alex) Rins didn't make a mistake, for sure we'd have kept sliding. For me was it just a matter of luck."

WRC 2 DRIVER SUFFERS HEAT EXHAUSTION

Rally driver Gus Greensmith suffered heat exhaustion during this year's WRC outing at Turkey, after taking a maiden win for the Ford Fiesta R5 Mk II.

Having been comfortably in control of the WRC's main support category WRC 2 Pro, Greensmith was holding a top-10 position when he went off the road just after the penultimate stage of the rally.

The car rolled onto its side and into a deep ditch, which forced him to work on recovering the car to make it to the finish.

Working on the car in the hot conditions while wearing his layered fireproof overalls caused him to suffer from heat exhaustion, which he was treated for immediately at the end of the rally.

"You don't notice at the time, but I was taken to the medics after the finish suffering from heat exhaustion," added Greenwood.

A summary of environmental heat illness for medics can be found here.

AUTO+ MEDICAL VIEW FROM THE GROUND

VIEW FROM THE GROUND:

DR BRENT MAY,

MBBS FANZCA MSC (TRAUMA) SPECIALIST ANAESTHETIST AND PREHOSPITAL PHYSICIAN
CHIEF MEDICAL OFFICER, FORMULA 1 VIETNAM AND AUSTRALIAN GRAND PRIX

Dr Brent May on training up local marshals for the inugural F1 race in Vietnam set to take place in May 2020

I am the Chief Medical Officer (CMO) for the inaugural Vietnam F1 Grand Prix on the streets of Hanoi. My role composes two main parts - to organise the medical team, service provision and logistics for this first Grand Prix, and to train the medical team and the Deputy CMO so that we can transition to a local CMO and team in the future. The Confederation of Australian Motor Sport (CAMS) has been appointed to assist in the set up and training of the local teams and I am responsible for the medical side. Dr Trinh Ngoc Duy is the Deputy CMO, a Hanoi Emergency Physician, who is tasked with the local organisation and administration having already had the chance to experience Formula One in Melbourne and Singapore as part of our training program.

CAMS is training all officials for this event with many processes occurring in parallel. Identification and training of senior officials is well underway. From a medical side, we held our first full training session of all medical officials in September. More than 120 medical staff were in attendance throughout the training and the event, most of these staff have come from the VinMec and 108 Military hospitals who have come together to form their first F1 Medical team. The senior medical officials also travelled to Singapore during the Grand Prix, where they were able to put practical and experiential learning to the theory they had just acquired, which was an invaluable part of the process and will enable the seniors to help train the rest of the medical team as we move forward.

This training program is a very similar to what we ran in Bahrain, Korea and Singapore. As we have in previous events, we will bring experienced Australian officials to train and assist the Vietnamese officials prior to and during the event with a transition to them taking on the roles as their confidence builds.

CAMS will train marshal teams for the 2020 Vietnam Grand Prix

The medical service will comprise the typical components required by the FIA International Sporting Code. The Track Medical Centre will be located in the outfield due to space limitations around the paddock area. This facility will be a purpose-built temporary facility immediately adjacent to the medical evacuation helicopter landing zone. It will have resuscitation facilities along with the ability to perform lifesaving operative procedures. There will also be diagnostic equipment including X Ray, and ultrasound. We will also have a small Paddock Medical Facility located immediately adjacent to the pits for the early assessment and management of drivers and teams.

There is almost no major motor sport experience in all of Vietnam outside of karting, with this being the first international circuit in the country. As we are starting from scratch, we are constantly planning in a very dynamic environment. The evolving track plan has meant the predicted medical center location and track vehicle positioning is always in a state of flux. As we get closer to the event, things become more certain but in the early stages we must remain dynamic and think outside the box for many issues. The first international circuit also means that we are also training the officials from an early stage in their motor sports expertise and experience. Being one of the longest circuits, this also brings some added complexities to how few plans our medical response. Not only are we thinking about high risk areas and rapid response times, we also need to think about redundancy.

AUTO+MEDICAL FEATURES

FEATURES

BODY OF DATA

Following the launch of the first ever guidelines for biometric data usage in motor sport, *AUTO+ Medical* investigates the ethical and legal implications of how driver data is gathered in this growing field of technology.

AUTO+MEDICAL FEATURES

Data informs everything in modern sport from coaching and athlete performance to injury prevention and fan engagement. In the past, much of this data was collected manually, but as consumer technology advances so has the means for this to become more automated.

In the US, the National Basketball League (NBA) was among the first to adopt wearable technology, which enables teams to track a player's heart rate, movements, and energy levels. The idea is that it can give coaches greater insight into who needs resting, who needs to be played more, and who might be at risk of injury.

This data enables teams to make better and more data-driven decisions regarding their athletes. But as the adoption of this technology becomes more widespread, the ethics surrounding the collection, storage and use of data has been a hot topic, especially as more sports, including motor sport, start to introduce biometric systems.

This has prompted the FIA to publish the first Guidelines for the Collection and Usage of Biometric Data in Motor Sport. The guidelines cover the use of competitor-related biometric data in various capacities such as medical and rescue, human performance monitoring, and for marketing and entertainment purposes.

Dr Pau Mota, FIA Head of Medical and Rescue, explains how the new guidelines aim to ensure that the motor sport sector uses this data appropriately.

"In motor sport, biometric data is there for a wide range of purposes and interests, and the FIA guidelines aim to ensure that we use the data properly from an ethical point of view," says Mota. "For the last two years we've started using real-time biometric data for rescue and emergency situations, but we want to avoid the mis-use of this data by third parties and, in addition, protect drivers' rights."

Recently, biometric technology has been either trialled or adopted in top level motor sport, a case in point being the biometric gloves introduced into Formula One and Formula E. In these championships it is mandatory for drivers to wear them on safety grounds, as it enables FIA doctors to monitor vital signs, such as oxygen levels and heart rate, as they are dispatched to an incident on track.

Similarly, IndyCar has introduced a 'smart shirt' that embeds an electrocardiogram and chest electromyogram into a driver's underwear. Drivers in F1 and IndyCar are also required to wear in-ear accelerometers, which are designed to measure the dynamic forces applied to a driver's head during an impact.

Biometric gloves were made mandotory in F1 this year

> **"BIOMETRIC DATA CAN PROVIDE VITAL INFORMATION ON A COMPETITOR'S HEALTH STATUS"**

And in Formula E, fans are shown 'stress level' information of a driver during a race. Implementing this is one of the challenges that the guidelines addresses, as due to the ethical sensitivity of broadcasting a driver's personal health data, the championship had to develop specific algorithms that maintain confidentiality by demonstrating stress-level without, for instance, showing heart rate.

"In the guidelines we advise that if you want to put the health-related data on TV for entertainment purposes, then you have to code everything so the personnel health data of the driver cannot be identified," says Mota.

DATA PROTECTION

However, in recent years, sports such as the US National Football League (NFL) and NBA have faced legal issues related to biometric data.

It is one of the reasons why teams in the NBA were effectively banned from using biometric technology in player contract negotiations, limiting it to health and performance purposes in training sessions.

The guidelines produced by the FIA aim to avoid such issues by detailing how biometric information should be protected in all scenarios to ensure that it is used ethically and does not breach privacy laws.

"We reviewed what was happening in other sports and looked to prevent these issues occurring in motor sport," explains Mota. "Our focus is the use of biometric data for medical and rescue proposes. For the other uses our main goal is to protect the privacy of the drivers and the ethical integrity of the sport."

Using it for rescue applications is particularly important for the FIA, which is now looking to implement it in other motor sport disciplines. In rallying, for instance, where rescue teams can often take a lot longer than to reach the driver in the event of an accident, information on the competitor's vital signs can be extremely useful for responders.

"OUR MAIN GOAL IS TO PROTECT THE PRIVACY OF THE DRIVERS AND THE ETHICAL INTEGRITY OF THE SPORT"

"The main field to apply this data could be in rally, where distances are greater and access to the injured competitors is more critical. Biometric data systems can provide vital information on the competitor's health status so it allows us to plan the medical intervention en route," says Mota.

TECH EVOLUTION

The FIA has already published a standard for biometric devices (8868-2018), which defines the design requirements for hardware to ensure it does not reduce the overall safety performance of a driver's safety gear, such as heat transmission and fire protection. The guidelines are different in that they deal with the data

Teams can monitor a drivers respitory freqeuncies with a 'smart shirt'

generated by these devices, and this document will be regularly updated to ensure that the FIA can keep up with the rate of technology development.

"One of the reasons to define best practice in a guidelines format - and not changing our International Sporting Code - is because technology in this area is developing so fast that we need a document that can be updated any time," explains Mota. "We plan to update the guidelines regularly, in line with the latest developments in this area."

The guidelines also give the FIA flexibility from a competition perspective, in case a new innovation comes along that could result in new ethical or competitive concerns.

As this technology develops from both a sporting and consumer point of view, the manner in which personal health data is collected and utilised by big tech firms is also a growing concern. In the case of sport, that data can be even more valuable, with the collection of biometric data from athletes, and the regulations behind it, likely to be a key area of interest for years to come.

View the FIA Guidelines for the Collection and Usage of Biometric Data in Motor Sport at: https://www.fia.com/medical


NFL players wear wristbands that track their performance

SCOT ELKINS

FIA Race Director, Formula E
Chief Operating Officer, Motorsport Safety Foundation

Many will know Scot Elkins through his distinctive voice as the Formula E Race Director, but his career in motor sport has spanned the last 25 years. Having first worked as a Sales and Support Engineer at Pi Research (now Cosworth) in 1995, Elkins moved to roles within top level motor sport in America such as Managing Director for the International Motor Sports Association and Technical Director for ChampCar before its merger with IndyCar. Today, alongside his FIA commitments, Elkins is the Chief Operating Officer of the Motorsport Safety Foundation (MSF).

AUTO+ Medical: You are the Race Director for Formula E; can you provide some insight into what that's like?
Scot Elkins: It is one of the greatest opportunities I have ever had in my career. To be a part of a relatively new championship which is so different and on the edge of technology is just fantastic! It is a challenging role as each event only happens in one day and is very fast paced.

A+M: How do you manage a one-day event and make sure it all runs smoothly from Race Control?
SE: It is all about managing the timetable over the course of the event, which means that everything must be done according to a very compressed schedule. This adds a level of pressure to all aspects of the race meeting - as they say, "It all works perfectly... until it doesn't!" The unique aspect of recharging the vehicles comes into play as a minimum amount of time is required to charge the batteries for the next session. So, whenever there is any kind of disruption in the schedule this must be kept in mind. We also have to be aware of the support series and other activities which the promoter has scheduled in regard to the timetable.

A+M: Given that a lot of Formula E races are action packed and can often have a lot of incidents, how do you draw the line between safety and entertainment?
SE: I don't think there is EVER a line between safety and entertainment, safety is always at the forefront of our minds and any other aspect is secondary. We have very close, tight racing on temporary street circuits and sometimes this leads to incidents, but we always consider safety first and foremost.

A+M: What measures are you putting in place to improve safety but also keep the racing competitive?
SE: The FIA has the most advanced safety department in motor sport and their work

Photo Credit: Shiv Gohil / Spacesuit Media

in this area is where we take direction. The Gen2 car which was introduced last season is a great example of the work of the safety department in regard to the safety systems that are used in the vehicle. The department also does a great amount of work in regard to the circuit safety. They are very involved in the design and development of the specialized temporary circuits in which Formula E competes. The simulations they do on each circuit primarily focuses on safety, but it also considers the competitive nature of the circuit.

A+M: Before each race there is always a driver briefing, how important is it to give drivers an open forum with officials on a race weekend?
SE: For me personally, this is the most important aspect of the briefing. I was lucky in 2018 to attend many Formula One briefings and to learn from Charlie Whiting on how to be “open but firm” in managing them. The drivers must have a forum to discuss the aspects of the event as their opinions are very important to its successful operation. We discuss topics in the briefing if we make changes to procedures or changes to the circuit based on the driver feedback, so it is extremely critical that the briefing is an open forum.

A+M: How different is the race director role for an international series compared to a national/grassroots race meeting?
SE: It is quite different. As an american, I was used to a role in which the Race Director was the primary decision maker and the Stewards operated as advisors. In an international series like Formula E, this is quite the opposite where the Stewards are the ultimate authority. At first this was a bit challenging, but as I experienced more races it has now become normal.

A+M: In addition to your role in Formula E, you work with the Motorsport Safety Foundation (MSF). What are the main projects you are working on there?
SE: I am the Chief Operating Officer of the MSF. I report to the board of directors and am responsible for the day-to-day operations. The MSF is a non-profit, so this includes fundraising, oversight of our initiatives and managing the budgets. We have recently transitioned the MSF into more of an Educational Foundation, so all of our initiatives are focused on that. Our main program is called ‘CERTIFIED’ and this program provides training and certification for instructors and coaches for High Performance Driving Education. As of this date we have trained over 2000 instructors and we are evolving the program to include more advanced training such as video and data analysis for the future.

A+M: What would you say has been your biggest challenge working in motor sport so far?
SE: I think the biggest challenge for me is the same for most others working in motor sport which is the travel and time away from family. Motor sport turns into a lifestyle, not just a job, and adapting to this can be a challenge. After 25 years it has become a part of my life and I quite enjoy the travel aspect, but I don’t think I will ever get used to being away from family.


Drivers can consult Elkins at any point during the weekend

“I WAS LUCKY TO ATTEND F1 DRIVER BREIFINGS AND LEARN FROM CHARLIE WHITING ON HOW TO BE OPEN BUT FIRM”

A+M: What is the most rewarding thing about working in motor sport?
SE: The most rewarding aspect to motor sport for me is the people you meet and work with. Motor sport is what I call a ‘passion sport’ and everyone that works in this industry has that same passion for the competition of motor sport. This gives it a unique ‘family’ in which we get to spend time with, which is what makes it the most rewarding.

A+M: If you could improve one thing in motor sport safety, what would it be?
SE: I wish that the aspects related to safety could be at no cost. Many times, in my career I have seen that safety has been compromised because of the cost of a safety device or product. Most grassroots competitors would rather spend money to improve performance instead of improving safety and I wish there was some way to remove this decision.

Volunteers ensure the smooth running of club and international level events

MARSHALLING MATTERS

AUTO+ Medical looks at the problems and the changing landscape of getting more people to become volunteers at race events from club level to international events.

They are the unsung heroes of motor sport. From club level all the way through to international competition, there would be no racing without volunteers. It sounds like a cliché, but that's exactly what happened at a British Automobile Racing Club meeting earlier this year.

Due to take place around the Anglesey coastal circuit in Wales, a 24-hour Citroen C1 race was cancelled because of a severe lack of marshals that signed up. This happened not long after a Britcar race at Donington Park was also forced to switch from using the Grand Prix layout of the circuit, to the shorter National configuration due to insufficient numbers of the orange army on the side-lines.

These incidents raise important questions over whether there are enough skilled and experienced volunteers around to ensure the smooth running of events, and what is being done to get more people involved.

The British Motorsport Marshals Club (BMMC) operates in the UK covering all

disciplines of motor sport including circuit racing, rallying and hill climb events. National Chair, Nadine Lewis explains how the number of national meetings in the UK has led to shortages of volunteers.

"If we have a weekend where there are multiple events at multiple venues, then the marshalling community gets stretched and people start making decisions to which one they want to go to," says Lewis. "Whether it's based on where they live, on the championship that they're following or whatever is happening at that event.

"So consequently, you will get events that are less well attended by marshals, and some events have the perception that they're not going to be particularly interesting so they vote with their feet and go to ones that they think will be more interesting."

On an international level this shortage can extend to a lack of experience altogether, which is something a lot of new F1 circuits face when training volunteers. When Bahrain became the first country in the Middle East to host a Grand Prix in 2004, it had to seek help from the Confederation of Australian Motor Sport on volunteer training.

This led to the creation of the Bahrain Motorsport Marshals Club (MMC), whose training eventually went into the structuring and implementing of the marshals team for the Azerbaijan Grand Prix. This year was the first time that the Baku-based event no longer required support, with it seeing a healthy number of volunteers thanks to the input from the MMC.

"As a result of the successful steps we have taken in recent years, the number of people who want to become an F1 marshal for our race weekend has been steadily increasing," said Chingiz Mehdiyev, Head of Operations for Baku City Circuit. "This can be clearly seen when comparing last year's application figures to this year's, which have risen from 1,603 to 2,445."

ORANGE ARMY

The BMMC has around 2,200 marshals registered to its club, while Motorsport UK has around 10,000 marshals registered in the country. But despite the large numbers, Lewis says the club is trying to do more to tap into the sections of the population who haven't thought about marshalling or know how to get into it.

"We'd kind of like to tap into those other areas of society where they haven't even been touched by motor sport, because I think a lot of it goes through families," says Lewis. "From my personal point of view, I hadn't even been to a race circuit, my dad used to watch F1 on the TV and that was it. So I came into this through an odd route, but a lot of people already are involved and it's connecting those people together and those outside the motor sport world."

One of the ways the BMMC is getting people involved is through taster days, whereby people can register online and come to a racetrack to see what marshals do and the type of work involved. Presenter for ITV's British Touring Car coverage, Paul O'Neil, is one of the ambassadors that attends these events which give people insight into traditional trackside jobs, in addition to tasks in Race Control such as timekeeping and scrutineering.

"We always say it's the cheapest way to spectate because you don't pay and you get the best seat in the house because it's right at the front," says Lewis. "But we as a club are certainly there to support people through training and gaining that experience. We're trying to get the message out there through various forms such as our ambassadors and being visible at other events, just to tell people what motor sport is about and get them involved as a volunteer."

The youngest age you can marshal in the UK is 11 years old, however the BMMC is mainly targeting the 40 to 55-year-olds due to their available free time and that they can get to the events with relative ease.

"The age range that we probably want to capture are the 40 to 55-year-olds," explains Lewis. "They've now got spare time on their hands, as young people are

still trying to find their way in the world. They have got the disposable income, they can probably make their own way to a venue, and they have got more free time on their hands with the added bonus that they actually might bring their kids along as well."

"MARSHALLING IS THE CHEAPEST WAY TO SPECTATE BECAUSE YOU DON'T PAY AND YOU GET THE BEST SEAT IN THE HOUSE"

MEDICAL INFLUENCE

Medical volunteers are particularly difficult to attract and most of the time will require payment as they provide a specialist service. In countries like Sweden and Norway medical staff have to be paid for the races to go ahead according to Thomas Heggelund, Chief Medical Officer for the Norwegian Motorsports Federation.

"In order to have motor sport in Norway we have to put in a standard level of first aid service, which means not many people do it for free," says Heggelund. Even then the medical provisions are not necessarily high level, as many events would not be able to exist if they had to meet stringent requirements. As Hegelund says: "If you want an anaesthetist for every race, there wouldn't be any racing in Norway because the small competitions couldn't afford it,"

Most races that take place in these countries are a mix of rally and rallycross, which means medical workers are required to be trained in first response. This is one of the standards that every national race meeting in Norway must conform to for it to take place, which was a challenge a few years back.

"Ten years ago, all the ambulances were privately owned or hired by the government," explains Heggelund. "Now almost all ambulances are state driven, it's getting harder and very expensive to rent them and pay the medical staff."

This approach to paying those who go out of their way to attend race meetings is perhaps something that could be employed elsewhere as the stigma of being classed as a 'volunteer' can often get in the way of crucial decision-making, something Lewis feels could be addressed if more attention was brought to the very people that are crucial to an event running smoothly.

"Sometimes money gets in the way of an awful lot of decision making and as we're volunteers we don't come into that bracket," says Lewis. "So we can get forgotten as a consequence, and it is an old cliché but without marshals motor sport simply would not happen. I don't think people quite realise sometimes that an event is largely being run by people who volunteer."

As the motor sport calendar grows and more circuits get built internationally, it seems the problem of volunteer shortages is always going to be prevalent. It does, however, highlight just how important these volunteers are to the smooth running of an event, from the men and women in orange trackside to the medical staff on site.

One benefit of being a volunteer marshal is getting close to the action

AUTO+MEDICAL FEATURES

INSIDE THE...

BMW M8 MOTOGP SAFETY CAR

AUTO+ Medical takes a look at the high-performance safety car used at the top tier of motorcycle racing.

MotoGP is the pinnacle of motorcycle racing where each bike operates at a very high level of performance, so naturally the championship needs a fast safety car to keep up with some of the world's fastest bikes.

Based on the recently launched BMW M8 Competition, the car above is the flagship of the entire safety car fleet and was developed in parallel with the companies World Endurance GTE-Pro car according to Markus Flasch, President of BMW.

"That's why it was a logical step for us to choose the BMW M8 Competition as a basis for our new MotoGP safety car," said Flasch. "Even in its production version, this high-performance automobile is suited to the racetrack. With its innovative technical features, it is yet another example of our quest to keep pushing the limit upwards."

Much like the GTE car, the MotoGP M8 Safety Car is a lightweight construction powered by a V8 engine using BMW M TwinPower Turbo technology. In addition, it is kitted out with BMW Performance-spec items including a titanium sport exhaust system, carbon engine cover, rear diffuser, air intakes, side skirts, fuel suction pump, and a tailor made roll-cage.

All of this enables the M8 Safety Car to produce 625bhp and to go from 0 to 62mph in 3.2 seconds, an important performance aspect considering it is needed to be rapidly dispatched at any point if there is an incident on track. The car is also fitted with an eight-speed M Steptronic transmission and utilises BMW's M xDrive all-wheel drive system, enabling it to tackle any type of track conditions thrown at it.

Mike LaFuente is tasked with driving the Safety Car five minutes before every race to check the track conditions. He will then lead the field away for the formation lap before the start of the race and pull into the pits, until he is required to make an appearance on track to slow the field down.

LaFuente controls the pack through the light panels on the roof of the car, which signal if a rider needs to be waived by in the event they need to catch up with the leader. There is also an onboard fire extinguisher system and race-spec Recaro seats to help cope with the G-Forces around the corners.

AUTO+MEDICAL FEATURES

THE ROAD BACK:

EMMA KIMILÄINEN

The W Series driver discusses her recovery after sitting out two rounds of the series this year and then returning with a win at Assen.

During the opening round of the newly launched W Series at Hockenheim, Emma Kimiläinen was battling through the field when fellow racer Megan Gilkes suddenly lost brake pressure and subsequently control of her car at 110kph heading into the Spitzkehre hairpin.

As Kimiläinen was midway through the corner, Gilkes struck the sidepod of Kimiläinen's car and took them both out on the spot. While both drivers were able to emerge unscathed, the crash reignited the symptoms of an earlier neck injury for Kimiläinen a few days after the race weekend.

She was subsequently advised to sit out the following rounds at Misano and Zolder on medical grounds, as she received specialist treatment in her home country of Finland. On her return two months later at the Norisring she managed to finish in the top five and followed that with a grand slam victory in Assen by taking pole position, the win, and fastest lap. *AUTO+ Medical* talks to Kimiläinen about her injuries and subsequent recovery.

AUTO+ Medical: Can you talk us through your injuries and how they happened?
Emma Kimiläinen: It started maybe like five days after the race, so everything seemed really fine until after the race. Megan, who crashed into me, lost control of her car completely and hit me when I was turning in to the corner. I was looking in the mirror but she was out of my sight and I was going maybe 30kph and when she hit me she was still going 110kph. So because I didn't expect anything coming, I didn't think that I needed to stiffen my muscles or anything like that so that was one thing that made it more difficult and it was just the wrong angle for the neck. I had an upper neck injury; I had a whiplash kind of an injury that injured the occipital nerves that come from the bottom of the skull to the top of the head. I had mostly symptoms which were neurological, so I didn't have any pain or anything but all of my balance and my sight and some feeling of pressure, like going up and down, everything was completely mixed.

AUTO+MEDICAL FEATURES

A+M: Did you seek advice from a doctor at this point?
EK: W Series uses Hintsa Performance as our healthcare and training provider, and Luke Bennet is the head doctor of motorsport business and he introduced me to Petri Helenius, a Finnish doctor who specialises in sport and also works for Hintsa Performance as a doctor in F1. He called me every day for the two months my situation was unclear - I haven't seen that kind of dedication and care before and I'm so grateful for that. He understood what help I needed and introduced me to another Finnish doctor Jukka-Pekka Kouri, who specialises in physiatry and pain.
All the MRI's were taken of my head, neck and back, but there was nothing abnormal. Kouri then figured out after all examinations that I had a whiplash injury. He injected anaesthetic to numb the nerves in my neck to be sure if the symptoms came from those nerves, then we found out that it did because all the symptoms disappeared but came back three days after the anaesthetic faded away.

A+M: What treatments did you have to do for the injury?
EK: We did radio frequency treatment to the occipitalis major and minor nerves in my neck. For a week I had a lot of pain in the neck and headache, as the doctor said it would be, but then after that all of the symptoms disappeared and my mind cleared. I got the reactions and balance back in few days later, and I tested the neck by driving go kart before entering to the race at Norisring in the beginning of July.

Grand Slam: Kimilainen took pole position, fastest lap, and the win at Assen

> **"WHEN I FINISHED THE RACE AND I FELT I HAD MY REACTIONS AND BALANCE BACK, IT WAS PRETTY GOOD"**

A+M: What was it like being on the side-lines, were you eager to get back racing?
EK: I needed to avoid all kinds of screens and all that because they made me feel really sick. Like on a smartphone if I would scroll the screen it would really make me sick, so I completely avoided that. I was just laying down and sleeping as much as I could to get the recovery working well. At home my husband was doing a lot of things, and then we have extended family who were taking care of many things so I'm grateful for those that I could recover well.

A+M: What was it like to get back into the car?
EK: I was super happy to be able to get back into the car and it was emotional when I finished the race and I couldn't feel any pain or anything, and I felt that my reactions and balance back that I had lost, so it was a pretty good feeling.
I got the quickest lap in the Norisring and even had the speed to win the race, but the qualifying didn't go that well and I started eighth, so I couldn't do any better than fifth. But then in Assen, I was quickest in all of the practices and qualifying and the race itself.

A+M: What advice do you have for drivers that suffer similar injuries?
EK: I hope that no one does! But just being patient and waiting for the right answers because I didn't know what it was, and nobody knew if it was going to keep coming back. I couldn't drive when it was still active because I didn't have any reactions or balance or anything, and it would've been a big risk for others and for myself. Also if I had a crash once again it would've been really bad because when the injury is active and you get a new shunt on top of it, that's always worse. So I was just being patient and taking it easy.

AUTO+MEDICAL SCIENCE

ACCIDENT CASE REPORT:

MISSED SPINAL FRACTURE IN MOTOR SPORT

INTRODUCTION

Healthcare practitioners working in motor sport frequently provide care for competitors involved in high-speed incidents, resulting in significant G Force translation to the body. Recent discussion of a previous event has highlighted some important learning points for our community; in particular, communication with onwards referral centres inexperienced in the management of severe impacts. For purposes of medical confidentiality, many details have been redacted.

INCIDENT

Following brake failure and a high-speed head-on impact with the TecPro barrier at 170mph (270kph), there was significant damage to the frontal crash structure and chassis of the car. The competitor involved in the incident self-extricated and mobilised independently. A short time later they developed back pain and were transferred to the on-site medical facilities for assessment.

Escalating back pain, associated with a clinical examination raising concern of spinal injury, prompted referral to a secondary care centre for spinal imaging. Importantly, the patient was reviewed at the circuit by senior doctors with experience in trauma and motorsport before being transferred.

The receiving institution, although identified as a trauma center, under-appreciated the forces sustained and did not undertake emergent trauma imaging as advised. The driver was discharged with little communication between the hospital and medical staff at the circuit. The following day, the driver returned to the circuit medical facility complaining of ongoing back pain and radicular symptoms. They were referred to another facility, significantly further away, where MRI of spine confirmed small, but significant spinal fractures. Although operative intervention was not required, late identification of the injury complicated onward referral and potentially subsequent recovery.

DISCUSSION

Many hospital emergency departments fail to appreciate that an accident in motor racing differs tremendously from an accident in a road car. Modern road cars are protected to an extent by active safety features, which remain active while driving and are designed to prevent accidents occurring.

These include; electronic traction control, stability control, automatic braking and lane departure warnings. In addition, many vehicles also have passive safety features, which work when needed to minimise the risk of injury, such as seat belts, air bags, construction of the seat and vehicle. These features are however often compromised in order to enhance occupant comfort and practicality.

In motor sport, however, there are comparatively few active safety systems. In our sport, the passive systems are far more effective, with current mechanisms allowing competitors to survive accidents at speeds that would otherwise result in significant injury or death in a road vehicle involved in a similar accident.

For example, the seat and harness employed in motorsport are designed to work together and offer far more protection than if used alone. In addition, a crash helmet and frontal head restraint system (FHR), interact with, in many cases, a protective energy absorbing shell and seat around the driver, providing further protection for vulnerable body areas such as the head and spine.

These complex systems often allow competitors to walk away from accidents that could potentially result in serious or fatal injury in occupants of road vehicles. Of course no system is indestructible - should these systems fail, such as for example failure of the seat mountings, these passive safety features have the potential to be rendered inoperable and with no additional features such as air bags and internal padding available, the interior of a race car can become a hostile environment.

The forces involved in motor sport are also often far greater than those experienced in most road car accidents.

Although road car crash protection has improved dramatically in recent decades, data from the Department of Transport (London, 2005) reveals an interesting relationship between velocity and injury in road vehicles.

Figure 1 shows the relationship between velocity and injury in road cars for a frontal impact where an impact speed of 90kph (55mph) results in an eight-in-ten chance of a fatality occurring.

Figure 2 shows that the probability of a fatality is even higher in side impact collisions, with the same probability of eight-in-ten at a lower speed of 70kph (43mph).

A more useful measure is delta-v which is often used as a better predictor of injury and is defined as the difference between the vehicle's immediate pre-impact and post-impact velocity.

In Figure 3, using delta-v for frontal impacts we can clearly see the relationship between higher speeds and more severe injury. The 50th percentile delta-v for slightly injured drivers is 11mph (17kph), for seriously injured drivers it is 24mph (39kph) and for fatally injured drivers it is 34mph (55kph).

In Figure 4 using the same layout for side impacts, we can see that the 50th percentile delta-v for slightly injured drivers is reduced to 8mph (13kph), for seriously injured drivers to 15mph (24kph) and for fatally injured drivers to 24mph (39kph).

It would be interesting to try and replicate these curves for race cars, despite the obvious fact that the race car is handling much more energy than a road car and yet only uses passive safety

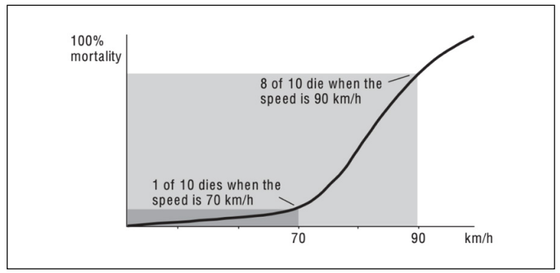


Figure 1: Probability of car driver/passenger fatility in head-on collision (Wramborg, 2005)

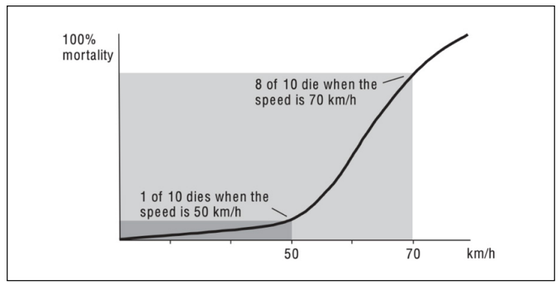


Figure 2: Probability of car driver/passenger fatility in side-impact collision (Wramborg, 2005)

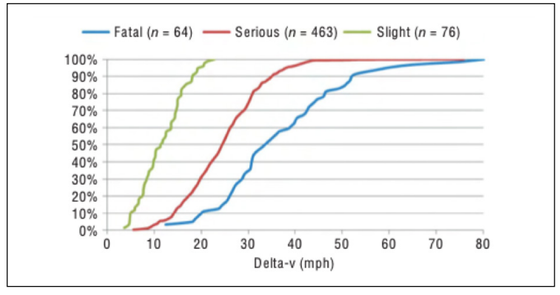


Figure 3: Cumulative speed curves for drivers in frontal impacts

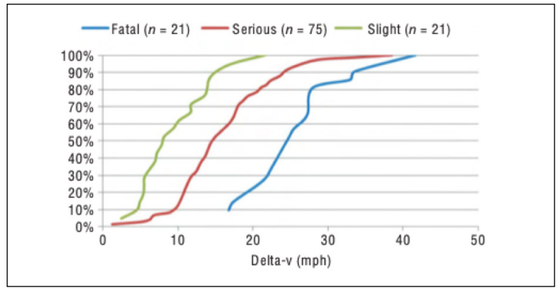


Figure 4: Cumulative speed curves for drivers in side impacts

systems. There are however other factors to consider such as:

Professional Drivers competing in high-speed international series tend to be younger and may respond differently to occupants of road cars.

The seating position of motorsport competitors have been optimised to prevent injury, as compared to the current position in road cars.

"THE BARRIERS AT MOTOR SPORT EVENTS ARE DESIGNED TO INTERACT WITH THE RACE CAR AND ABSORB ENERGY"

The barriers at motorsport events are designed to interact with the race car and absorb energy, which is not replicated exactly on the road.

Race cars are inherently stiffer and have additional protection which prevents intrusion.

The clinical irony is that if a driver of a road car is involved in what is considered by the lay community to be a high-speed incident, in the UK they will be transferred to a trauma centre. If at arrival they were found to have back pain and radicular signs, they would have undergone emergent trauma imaging according to current spinal injury protocols (see National Institute for Health and Care

Current safety mechanisms enable competitors to survive accidents at high speeds

Motor sport uses more passive safety systems rather than active

Excellence, NICE UK). As this case demonstrates, such protocol was not applied directly to a patient sustaining similar injuries in motor sport, owing to an under-appreciation of the forces involved in the incident.

This lack of understanding of motor sport mechanisms and forces, can and has, lead to confusion in hospital emergency departments, with patients involved in similar incidents often treated differently at the same hospital. For example, a competitor referred for assessment with a history of having crashed in excess of 100mph has in some cases resulted in a full trauma team awaiting their arrival, whereas on other occasions the competitor will be seen in the minor injury unit. Additional miscommunication may be added in cases such as the above due to the relatively uninjured condition of the driver. As a result it is likely that the salient factor of a 170mph impact was overlooked and therefore appropriate investigations were not considered necessary.

“MANY HOSPITALS FAIL TO APPRECIATE THAT ACCIDENTS IN MOTOR RACING DIFFER FROM ACCIDENTS IN A ROAD CAR”

We therefore suggest the following action points which may be relevant to national and international circuits:

A detailed referral between senior clinicians, accompanied by verbal handover between the two, including the mechanism of injury, impact velocity, extrication methods, details of the accident and clinical findings, as well as any video footage of the accident and relevant still images of damage to the vehicle and helmet. In some cases, data from the Accident Data Recorder may also be made available, either as a verbal summary or a data readout.

Engagement with major receiving hospitals involved with motor sport circuits and events prior to the event occurring. For instance, National Sporting Authorities might arrange a series of educational opportunities including lectures to staff in hospitals and visits for all members of the healthcare team to the motor sport venue, in order to share knowledge and explain the mechanisms and potential for injury. This would allow fellow healthcare practitioners to better understand the risks involved in motorsport. At a later stage, hospitals could also be recognised in a formal review process following such events.

Development of FIA guidelines or consensus statements specific to motorsport injuries, similar to those issued by NICE, the UK Faculty of Pre-Hospital Care and the Canadian C-spine guidelines. Such documents would include potential mechanisms of injury for high-speed accidents and appropriate assessment methods, as well as protocols for immobilisation, appropriate referral destinations, suggested imaging and options for patient transfer.

In all cases both the assessing and receiving clinicians should have a high degree of suspicion for injury after motorsport incidents and should be prepared to insist that appropriate imaging is undertaken so that injured participants can return to competition as safely and as quickly as possible.

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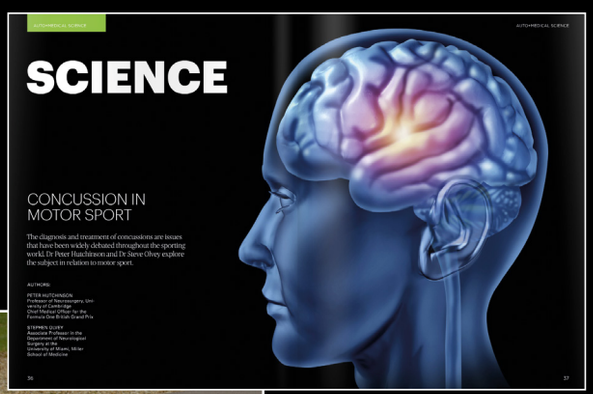
+ CALL FOR SUBMISSIONS

Every issue of AUTO+ Medical contains a research paper or injury case study that takes a scientific look at the sport.

All submissions are welcome so if you have a study that you feel would be suitable for publication in future issues of AUTO+ Medical, please send it to: automedical@fia.com

For each submission please include a summary of the research and all necessary contact information.

The editorial board will evaluate each submission before it is accepted for use in the magazine.



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