



AUTO+ MEDICAL

PRACTICE MAKES PERFECT

Training courses for medical teams are essential for delivering best practice P12

LEADING THE WAY

The FFSA reveals how it became world's first FIA Institute Medical Training Provider P18

ANTHONY DAVIDSON

The FIA World Endurance Championship driver on his successful return from injury P26



EXPERTS IN EXTRICATION

How improvements in medical training are helping drivers worldwide

Contents

NEWS/

- P4 Medical Accreditation Programme Launched
- P4 Malaysian Motor Sport Medical Society Launched
- P5 Australia Gets to Grips with F1 Extrication Simulator
- P6 Excellence Achieved in Germany
- P6 Medical Seminar in Bahrain
- P7 Fund Approves Medical Projects Worldwide
- P8 Medical Summit in Qatar
- P8 Training on Two-Wheels and Four
- P10 Medical Commission Meets
- P11 Mexico Leads Medical Discussion

FOCUS/

- P12 PRACTICE MAKES PERFECT
International training courses for motor sport extrication teams are essential for the delivery of best practice worldwide.
- P18 LEADING THE WAY
From circuits littered with ravines to the world's first Medical Regional Training Provider, the Fédération Française du Sport Automobile has come a long way.

ANALYSIS/

- P22 CMO PROFILE: DR. CHRISTIAN WAHLEN
In conversation with Dr Christian Wahlen, the Chief Medical Officer of the Belgian Grand Prix
- P26 THE ROAD BACK: ANTHONY DAVIDSON
Anthony Davidson talks about his recovery from a major accident at Le Mans and his succesful return to motor sport

SCIENCE/

- P30 SCIENCE: SPINAL INJURIES AND MOTOR SPORT
Dr Paul Trafford examines the science behind spinal injury and the latest research surrounding it
- P42 ROLE OF THE FIA MEDICAL COMMISSION
The FIA Medical Commission plays a central role in the development of the latest medically-focussed regulations in motor sport



Welcome to the first issue of AUTO+Medical, the international journal of motor sport medicine. We want this publication to be both informative and interactive, engaging with the motor sport medical community and the wider racing industry. It is designed to facilitate the cross-sharing of medical information, as well as informing on the latest medical news from the FIA, FIA Institute, National Sporting Authorities and medical personnel around the world.

I would like to encourage you to engage with the Journal by sending in your comments, thoughts and articles on medical issues in motor sport. With an active readership, we can continue to promote the work done by all our members in advancing medical practice and improving motor sport safety.

This first issue of the journal focuses on extrication, one of the most important areas covered by medical practitioners in motor sport. An incorrect extrication of a driver from a vehicle following an accident can have devastating effects. Fortunately, medical care in motor sport and particularly extrication has improved significantly in recent years. Modern extrication teams are professional in their preparation and practice, providing the highest standards when extricating a driver following an accident.

I hope you enjoy reading the inaugural issue of AUTO+Medical and I look forward to receiving your contributions for future content.

Professor Gérard Saillant
FIA Institute President

NEWS

MEDICAL ACCREDITATION PROGRAMME LAUNCHED

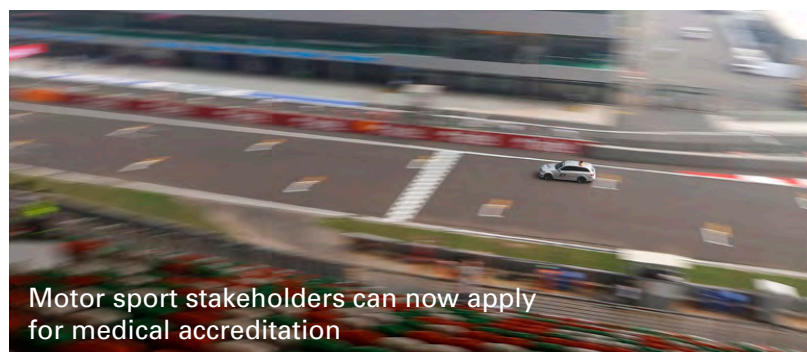
The FIA Institute officially launched its Medical Accreditation Programme to help National Sporting Authorities (ASNs) achieve the highest levels of excellence for medical training and practice.

The launch of the [initiative online](#) followed the recent accreditation for the Fédération Française du Sport Automobile (FFSA), which was awarded the top level, Achievement of Excellence, and has now become a Regional Training Provider (RTP) in the motor sport medical area.

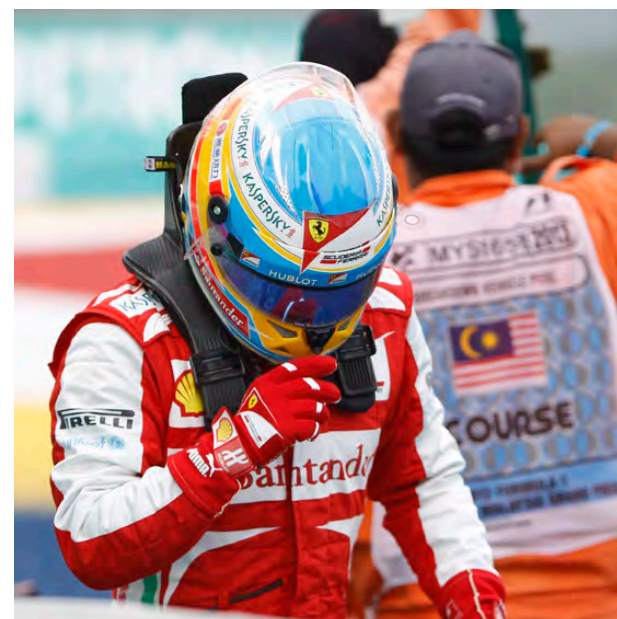
FIA Institute President Gérard Saillant said, “The Medical Accreditation Programme is a key step in developing better and safer medical practices. The Institute is keen to encourage excellence in this area and a cross-sharing of medical knowledge that will benefit motor sport worldwide.” The Medical Programme forms part of the Officials Safety Training Programme, which was recently expanded to incorporate guidelines that include specific motor sport medical elements.

ASNs will be able to apply for accreditation at three different levels: Commitment to Excellence, Progress to Excellence and Achievement of Excellence. Those that reach Achievement of Excellence can apply to become a Regional Training Provider for medical training. ASNs that are selected to become RTPs will then deliver medical courses and qualifications on behalf of the Institute around the world.

This is the case for the FFSA, which held an extrication course in Le Mans on 23-25 January. Graduates of the course received an Institute recommendation to operate as an extrication team at all FIA World Championship events for the following two years.



Motor sport stakeholders can now apply for medical accreditation



New society to improve medical provisions at circuits across Malaysia

MALAYSIAN MOTOR SPORT MEDICAL SOCIETY LAUNCHED

The Malaysian Society of Motorsport and Traffic Medicine (MSMTrM) has been launched to improve medical provisions at race tracks and for road users in the country.

Formed prior to the Malaysian Grand Prix (28-30 March), the new group participated in the 16th annual Formula One Medical Seminar. The seminar, held on the weekend of the Malaysian Grand Prix, provided insight into the latest medical knowledge and skills in motor sport to medical staff working at the race.

This year the event focused on the idea of immediate treatment. FIA Chief Medical Officer for the Grand Prix, Major General Datuk Dr Mohd Zin Bidin said: “The concept of the golden hours in initial assessment of life threatening injury in motorsport is one of the key topics that we discussed.”

A workshop focusing on track simulation training was conducted with medical personnel familiarising themselves with helmet removal, airway and burns management, CPR and extrication practices.

CIRCUITS GETS TO GRIPS WITH F1 EXTRICATION SIMULATOR

The FIA Institute F1 extrication simulator has been delivered to circuits in Australia, Bahrain, Germany, Spain and UAE to help with the training of extrication teams before an event. In Australia, for instance, it was put to full use by the Confederation of Australian Motor Sport (CAMS) ahead of the season opening Australian Grand Prix (14-16 March).

The simulator, developed by the Institute to aid in extrication training, enabled all CAMS Medical Extrication teams at the Grand Prix to practice their techniques and skills. Dr Rik Hagen, CAMS official and Deputy Chief Medical Officer at the Australian Grand Prix, said: “It’s great that the FIA Institute provided this training tub. The inside of the cockpit surrounds are almost identical to a Formula One car.”

A number of timed exercises took place in the week leading up to the F1 weekend. The Scuderia Toro Rosso F1 team provided the use of its garage and other facilities to aid in practice. FIA staff were on hand to oversee the drills, including FIA F1 Medical Delegate, Professor Jean Charles Piette.

“The whole idea is that you are prepared for the worst while hoping your services are not required at these events,” added Hagen. “In an actual emergency, we want to be able to get the driver out of the vehicle, smoothly and quickly, all the while protecting their spine and in particular their neck.”

The simulator is available to circuits around the world and can be used for practice before and during race weekends. It is also available at training events for extrication teams working at other FIA World Championship races, enabling them to get hands on, practical experience prior to an event.

Made from fibre-glass, the simulators are replicas of F1 cars from the nosecone to just behind the driver. They feature everything you would encounter in modern Formula One tubs, from cameras and steering wheels, to a removable extrication seat.





EXCELLENCE ACHIEVED IN GERMANY

The Deutscher Motor Sport Bund (DMSB) has been awarded the FIA Institute's Achievement of Excellence in the Medical Accreditation Programme. The DMSB is now set to become the second Regional Training Provider (RTP) in the motor sport medical area.

The Achievement of Excellence is the top award level in the Accreditation Programme. To gain this level, an ASN must demonstrate the highest standards of medical management and training.

Sven Stoppe, Director of DMSB's Training Academy, said: "The Achievement of Excellence Accreditation is great news for the DMSB. We are passionate about the work we do in medical motor sport safety and are keen to share our knowledge and expertise with other ASN's in Europe."

The Fédération Française du Sport Automobile (FFSA) became the first ASN to reach Achievement of Excellence accreditation and also became the first Medical RTP. It recently hosted an extrication event at Le Mans to train medical teams from around the world in the latest techniques of driver removal following an accident.

FIA Institute President Gérard Saillant said: "It is great to see ASN's engaging with the Medical Accreditation Programme. Following the success of the FFSA and its first regional training event I am excited to see how the DMSB can further help to train other medical teams around the world."

MEDICAL SEMINAR IN BAHRAIN

The Bahrain Motor Federation (BMF) held a two-day medical seminar focussing on immediate post-accident trauma management and extrication training in March.

The event was led by Chief Medical Officer's Dr Amjad Obeid and Dr Michael Scholz and supported by FFSA RTP representative Dr Jean-Jacques Issermann. A number of medical experts from Bahrain were also on hand to deliver content.

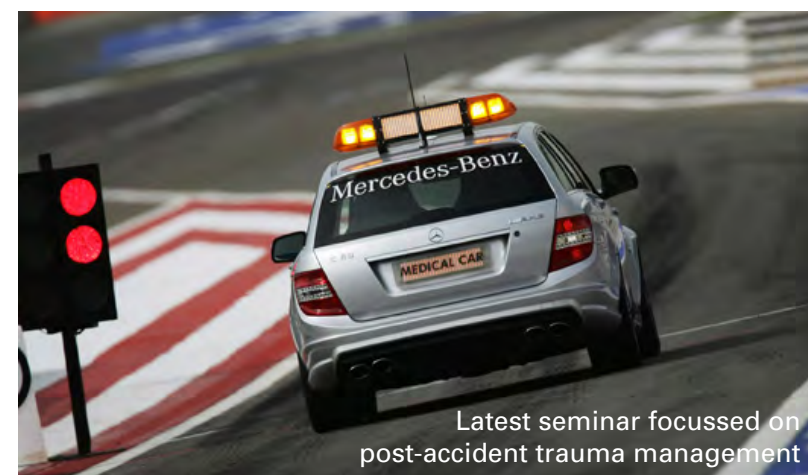
Day one began with a brief refresher session for all attending delegates, concentrating on relevant medical principles relating to trauma management. Topics were covered in terms of initial priority and included the kinetics of an accident, initial trauma assessment through to airway management and spinal injury management.

These subject areas were then discussed in a motor sport environment – detailed presentations on procedures and protocols that should be utilised in the aftermath of an accident were given. This included detailed sessions on how casualties should be assessed and processed, through to the parking of medical vehicles at the scene of an incident.

Discussion between subject experts and delegates was stimulated by these presentations, helping provide a cross-pollination of medical information.

The extrication process was the focus of the second day. FIA Medical Commission member, Jean-Jacques Issermann, explained the process in detail to each attending extrication team. They were shown the various steps of the task, first performing the steps separately and then linking them together to enact the entire procedure.

Differing processes for closed and open car extrication were practiced to enable the teams to experience a number of scenarios they may be confronted with. They were also taught how to carry out an emergency extrication where the speedy removal of a driver is imperative, as opposed to a standard extrication.



Latest seminar focussed on post-accident trauma management



Brazil is one of the beneficiaries of funding for medical-focussed projects across the world

FUND APPROVES MEDICAL PROJECTS WORLDWIDE

The Motor Sport Safety Development Fund has approved grants for a number of medical-focused projects across the world.

In Brazil, funding has been allocated to develop and implement medical and extrication training for officials. The aim is to improve competency levels of medical officials and develop a network of skilled medical staff in Brazil and throughout South America.

Bahrain secured funding to host and conduct a practical extrication-training seminar. The seminar, which took place in March (see news article on page 6) helped to improve the competency of all extrication teams in the Middle East and North Africa region and standardise the skill levels of these medical teams.

The Fédération Française du Sport Automobile (FFSA), the

first approved Medical Regional Training Provider, will conduct theoretical and practical extrication training. The primary goal is to improve competency levels of medical personnel in the conduct of extrication procedures.

In Africa, Zambia has secured funding to continue conducting motor sport safety training for rally officials with a specific emphasis on extrication training. The grant will enable the Zambia Motor Sport Association to improve the competency of rally officials and medical staff to ensure the safe practice of motor sport events.

The Motor Sport Safety Development Fund was established in 2007. Its purpose is to enable the development of safety at motor sport events around the globe through a distribution of funds to FIA National Sporting Authorities.

MEDICAL SUMMIT IN QATAR

The next FIA Institute Medical Summit will take place in Doha, Qatar in early December. The summit will focus on the topics of electric and hybrid car safety, rally safety including extrication and disincarceration, patient-transfer issues and the issues of concussion.

The Medical Summit is a biannual event with the last summit taking place in Istanbul, Turkey in 2012. The format for that event featured a Chief Medical Officers' seminar, a two-topic round table debate and workshops running in rotation. It has been agreed that the 2014 event in Doha will follow the same format.

Over 200 delegates from a range of backgrounds, including physicians, engineers, technicians and researchers attended the last Medical Summit. The event also included keynote presentations from leading sports medicine experts from the International Olympic Committee and the Fédération Internationale de Motocyclisme. These presentations discussed the medical care structure at the Olympic games and the configuration of medical services at motorcycle world championship events.

Speaking in Istanbul in 2012, Jean Todt said: "The Medical Summit is an important event not just for the medical community but for anyone involved in motor racing."

FIA Institute President Gérard Saillant added: "It has always been essential for us to create a multi-disciplinary event with delegates from a range of backgrounds who can have a positive effect on motor sport medicine. The Summit forms a major part of our commitment to excellence in motor sport safety worldwide."

Further information about the 2014 Medical Summit in Doha will be released throughout the year.



F1 Extrication Simulator on display



Over 250 participants from across Germany attended the event



TRAINING ON TWO-WHEELS AND FOUR

The Deutscher Motor Sport Bund (DMSB) held a medical training event at the Oschersleben circuit in Germany in March, bringing together members from both the car-racing and motorcycle-racing communities. It was the first time that the DMSB had hosted an event that combined the medical education for both disciplines in one place.

There were over 20 course instructors at the event, helping to teach and train over 250 participants in a variety of motor sport safety areas. Various modules were available and these were held more than once over the course of the three-day event to allow all attendees to participate in them. Each module featured theoretical instructions along with practical training.

Dr Michael Scholz, the DMSB's association doctor, said: "The new, compact training proved to be a major success. This year's DMSB training programme featured new courses - 'Medical Car Doctor' and 'Medical Car Driver/Paramedic' - two modules that are necessary for obtaining the MedCar license."

The first day the event focused on this medical car training. Modules trained medical car teams on their individual roles whilst enabling them to perform in a coordinated and timely manner.

Extrication was another focus of the event. Both national and international extrication teams attended the course that featured extensive practical training. The participants were then invited to undertake an examination to gain certification to work as extrication teams at motor sport events. All teams passed successfully with the Nürburgring and Hockenheimring extrication teams being certified for international level. The Lausitzring and Sachsenring extrication teams successfully completed the course to gain certification to work at national events.

Race Track Trauma Life Support taught participants a concept for the structured and priority orientated medical care for seriously injured patients at a race circuit. The theoretical session focused on rescuing persons injured in a

racing car before the practical session expanded to include a number of different scenarios.

Participants had to deal with a variety of different issues including bleeding, airway management and thorax drainage. Special attention was paid to injuries resulting from a rallying accident.

The highlight of the seminar's final day was a simulation of a realistic incident that involved all seminar participants. The scenario involved an electric powered car that had exploded injuring 11 people. The entire rescue chain was involved in dealing with the incident, from race control through to the medical car and extrication teams.

"This arguably has never been trained to this extent as the high number of injured people took all the participants involved to their capacity and logistical limits," said Scholz. "The debriefing was extremely constructive. Every participant definitely learnt a great deal as they were pushed to their limits in this special module."

F1 Medical Car and Safety Car at the Bahrain International Circuit ahead of the 2014 Bahrain Grand Prix



MEDICAL COMMISSION MEETS

The FIA Medical Commission met on 17 May in Paris to discuss the latest development in motor sport medicine.

During a busy Agenda, the Commission was informed about the proposals and decisions from the World Motor Sport Council held in April along with reports from the Safety Commission, Serious Accident Study Group, Closed Road Commission, World Championship Commissions and FIA Institute.

Discussions took place concerning extrication teams, including their regulations and training. The new training programme for doctors was also discussed, as well as the next edition of the Motor Sport in Medicine book, which is currently being planned with Dr. Ian Roberts and Dr. Paul Trafford.

Dr Phil Rayner made a presentation on the new FIA Formula E series including the proposed safety systems in place and the training that would be given for the teams and officials including marshals.

Sandra Silviero Camargo and Dr. Jean Charles Piette presented an update about WADA, doping tests and the Race True programme.

A report made by a team of experts on vision problems in competitors was consid-

ered, including monocular vision. Further work is being undertaken in this area and the commission will be updated when this work has been done.

The Chief Medical Officers (CMOs) of F1, WRC, WTCC and WEC then reported on the events they had attended so far this year and any issues faced.

There was much interest in the new FIA World Rallycross Championship especially with respect to Appendix H requirements, the medical questionnaire, the medical centres available and the CMOs. All agreed that harmonisation of simple things like warning lights and warning labels in all championships would be a huge advantage for emergency workers and this request would be submitted to the Safety Commission.

The issue of the demographics of blood groups in different regions took place and what might be available to an injured competitor with a rare blood group in certain parts of the World.

Discussions also took place concerning the FIA Sport Conference to be held in Munich in June and the next biennial FIA CMO Seminar and FIA Institute Medical Summit, which would be held in Qatar in December 2014.



Rally Mexico, 2014 World Rally Championship

MEXICO LEADS MEDICAL DISCUSSION

A Pan-American medical seminar to discuss motor sport medical care and to train teams from around the region will be held in Acapulco, Mexico this November.

Hosted by the Organización Mexicana del Deporte Automovilístico Internacional (OMDAI), the three-day event will focus on various medical skills including extrication and advanced trauma life support.

The seminar will begin with a detailed talk on medical intervention in motor sport followed by a close inspection of the latest developments in safety measures and devices. Question sessions will be held to enable delegates to gain specific advice from various medical experts along with a discussion panel on safety in motor sport.

The final day of the seminar will see attending medical teams break into groups to test their extrication and advanced trauma life support skills. OMDAI will assess the work of the teams and those who pass the examination will receive certification.

Anti-doping procedures will be covered at the event and a workshop on Pan-American agreements for medical care in motor sport will take place.

Jose Abeid, President of OMDAI, revealed plans for the seminar to the FIA Medical Commission in Paris in May.

FOCUS

PRACTICE MAKES PERFECT

International training courses for motor sport extrication teams are essential for the delivery of best practice worldwide.

It is January 2014 at the Le Mans circuit in Northern France and over 20 extrication teams from around the world are gathered for a specialist training course organised by the Fédération Française du Sport Automobile (FFSA) and the FIA Institute.

They include teams from Spain, UK, Belgium, Portugal, Holland and Germany, as well as delegates from the rest of the world there to observe the training, with representatives from as far afield as Japan, Argentina, Australia, USA, Canada and South Africa.

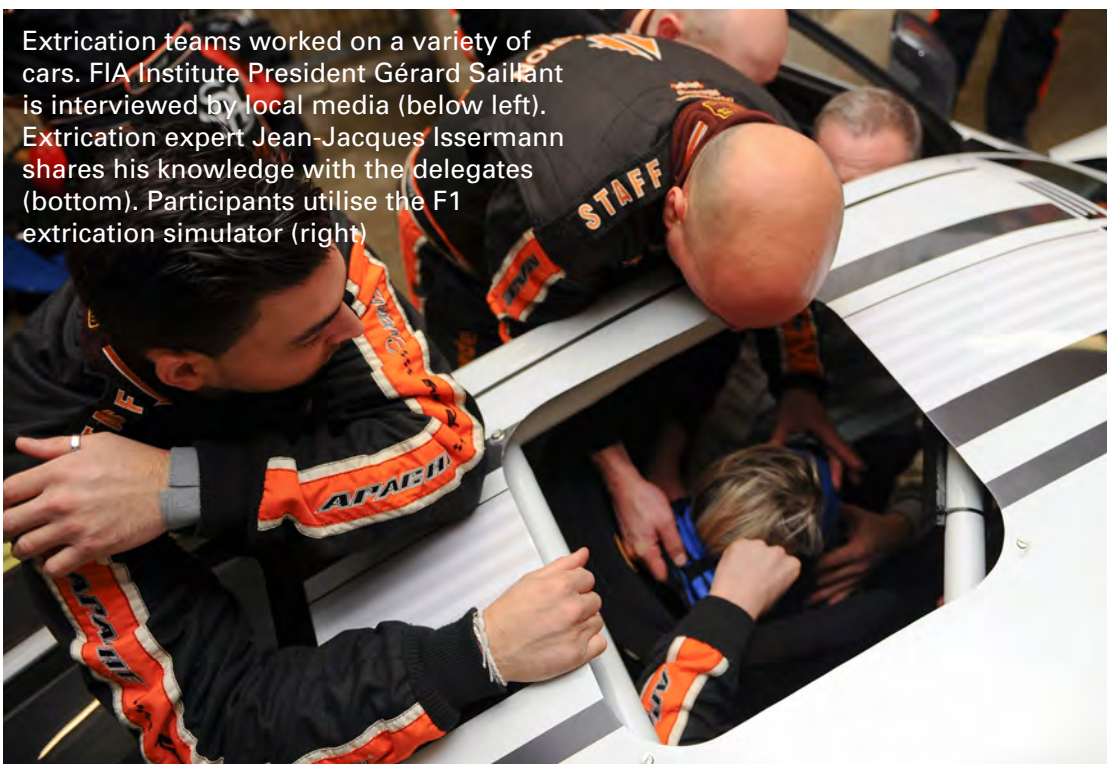
This global gathering is there not just to develop new skills but also to learn from each other, ensuring that best practice for extrication in motor sport is utilised the world over.

The extrication course was developed over the last two years by Dr. Jean-Jacques Issermann and FIA Institute Medical Advisor Dr. Paul Trafford, along with all of the FIA Medical Delegates.

The two-day training event at Le Mans enabled extrication teams from around the globe to familiarise themselves



Over 20 extrication teams from around the world attended the event



Extrication teams worked on a variety of cars. FIA Institute President Gérard Saillant is interviewed by local media (below left). Extrication expert Jean-Jacques Issermann shares his knowledge with the delegates (bottom). Participants utilise the F1 extrication simulator (right)



with the latest knowledge, techniques and equipment under expert guidance. The FFSA, which was recently accredited as the FIA Institute's first medical Regional Training Provider (RTP), was ideally placed to lead to course.

A number of training resources were provided to help the participants, including Toyota's TS030 Hybrid Le Mans Challenger, two GP2 chassis supplied by the DAMS team and the FIA Institute's new F1 extrication simulator. All extrication teams were able to acquaint themselves with a variety of machinery and methods to extricate a stricken driver from their vehicle.

"The objective of training such as this is to standardize the international extrication procedures so that the training is the same everywhere in the world," said Professor Jean-Charles Piette, Deputy President of the FIA Medical Commission.

Certainly, such international medical training events represent a huge step forward in enabling racetracks to provide the best possible care following a large incident. Extrication from a vehicle is a crucial period in the aftermath of an accident as stabilising and immobilising a driver are imperative to prevent further injury.

In his opening address to the event, FIA Institute President Professor Gerard Saillant said: "Extrication in motor sport is a medical practice that requires a very specific set of skills, and its exercise is something the medical motor sport community has perfected over many years."

These skills were not perfected overnight. It has been a long and often painful process to reach the level of professionalism many take for granted today.

Incidents where a driver suffered long term injury due to inadequate medical attention were all too common in the 1970s and 1980s.

Phillipe Streiff is a driver that knows this all too well. In 1989, Streiff, a midfield runner for the AGS team in Formula One, was taking part in a test at the Jacarepagua circuit in Rio De Janeiro ahead of the Brazilian Grand Prix. He suffered a mechanical failure in a fast right-hand kink causing his car to leave the track and launch off a raised kerb at the exit of the corner.

The car violently cartwheeled ripping off the engine, wheels and roll-hoop, eventually coming to rest inverted on the other side of the barrier. Trackside marshals righted the car with little regard for Streiff before removing him from

the monocoque and laying him on the grass to await an ambulance.

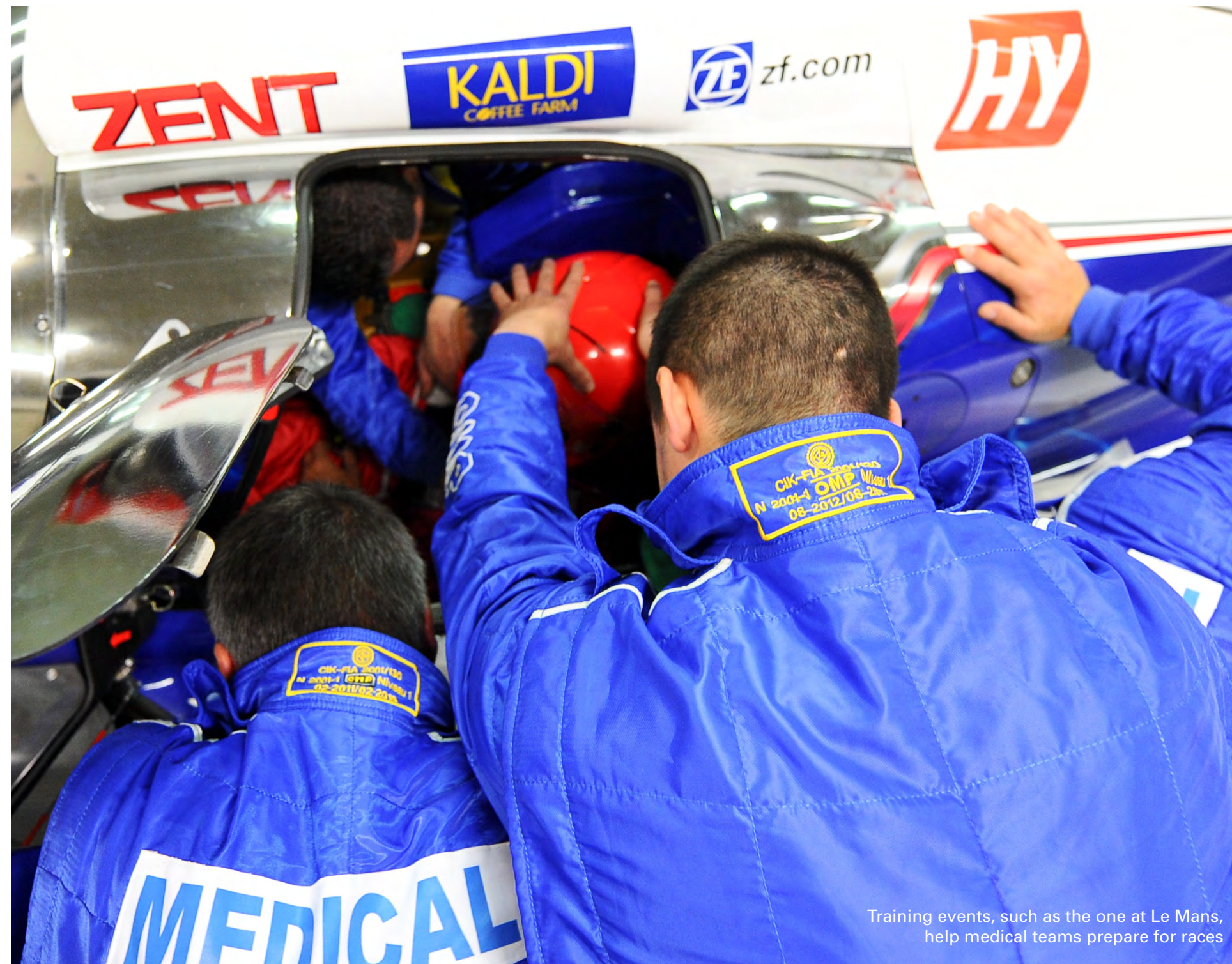
“The people who reached me first were corner workers and they did what they thought was right, of course,” said Streiff in a recent interview with *Autosport*. “But they were not medically trained people who worked to a procedure. Today, after an accident you cannot move the head and you must keep a casualty completely still and block any movement with special padded restraints. So what happened to me immediately after my accident ensured I would never walk again.”

As a consequence of this accident, a major meeting was held in Paris and the position of Permanent Medical Delegate was created, with Jean-Jacques Issermann selected for the role. He ran the first extrication exercise in Birmingham in July 1989.

A few days later, another incident occurred on track. Emanuele Pirro, driving for the Benetton-Ford team at the 1989 German Grand Prix in Hockenheim, crashed into a number of Styrofoam barriers entering the stadium section. Pirro injured his neck in the accident and, in visible pain, was lifted from his car without any medical equipment being used. He received medical attention on the ground next to his car before being taken to hospital.

This was to prove another turning point. Issermann remembers: “Following the visually unacceptable way Pirro had been rescued at the Hockenheim GP, President Jean-Marie Ballestre demanded that an immediate solution be found not to witness this scene any more.”

As Medical Delegate, Issermann drafted new extrication regulations and these were presented to teams and drivers at



Training events, such as the one at Le Mans, help medical teams prepare for races

the Hungarian Grand Prix in August. In early 1990, they were adopted unanimously by the World Motor Sport Council, following recommendation by the FISA Medical Commission.

There is now a clear plan when dealing with the aftermath of an accident, following the introduction of extrication

teams to F1 in 1990. Six-man KED teams (named after the Kendrick Extrication Device they initially used to remove drivers safely from the chassis) led by a physician are on hand at every grand prix in the case of an emergency.

Their job has been helped in recent years by the introduction of extricable

seats. This has meant that in many cases the driver can be removed from the car while still in their seat, with the seat acting as a spinal splint. But that does not detract from the importance of the KED teams and their work.

In the event of an accident, a Medical Intervention Vehicle will arrive first at

the scene and perform an initial assessment. Upon arrival of the extrication unit, the trackside doctor briefs the extrication team leader on the situation and together they determine an extrication strategy. The extrication team then steps in and carries out the agreed extrication procedure, updating the doctor on any changes to the victim’s status.

There is an official extrication exercise on the Thursday before every Formula One race weekend when teams have access to F1 cars. But with extrication simulators such as those provided by the FIA Institute, teams can now practice all year round with a chassis identical to the one used by F1 teams, ensuring KED teams are better prepared than ever.

Practice is crucial for an extrication team to be effective. Training events, such as the one at Le Mans, help medical teams prepare for races and provide a forum for the dissemination of knowledge about extrication.

The FIA and FIA Institute are now aiming to ensure there is a global standard for all extrication teams so that whatever the event, the best care is provided following an accident.

The launch of the Medical Accreditation Programme that enable National Sporting Authorities such as the FFSA to become RTPs is evidence of this.

As Prof Saillant said: “We are very much looking forward to the situation when further RTPs are approved and able to deliver this training within their own geographical regions. At the end of the day, the most important thing is to save lives.”

The old F1 circuit near Clermont-Ferrand was notorious for its gullies and sharp drops



LEADING THE WAY

From circuits littered with ravines to the world's first Medical Regional Training Provider, the Fédération Française du Sport Automobile has come a long way.



FFSA Medical Commission President Alain Chantegret

Twisting its way around an extinct volcano in the Auvergne Mountains of France, the Charade circuit near Clermont-Ferrand was a notoriously challenging track. Described as the “French Nordschleife”, it was famed for its gullies and sharp drops with little run off area to protect any wayward drivers. Host of four Formula One Grands Prix, the original

Circuit Clermont-Ferrand was finally closed in 1988 making way for a much safer abbreviated version of the track.

Fast forward to 2014 and the Fédération Française du Sport Automobile (FFSA) has ushered the sport a long way since those dangerous days. As the FIA Institute's first Medical Regional Training Provider (RTP) it is leading the way and is now seeking to help other National Sporting Authorities to achieve excellence in this field.

“I was involved for the first time as a motor sport doctor at the 1972 F1 Grand Prix at Charade,” remembers Alain Chantegret, who is now President of the FFSA's Medical Commission “The old circuit was just a normal road with ravines and precipices on one side, mountains on the other and no run off at all; it was a great track but it had no safety.”

Chantegret began leading the charge soon after, as he pushed for improvements at racing circuits across the country. He joined the FFSA in 1984 and was also Chief Medical Officer at Magny-Cours, where he designed the medical systems and facilities that were required at the track for an F1 event.

“Little by little things changed in the regulations for cars,” he says. “For circuits and for medical practices that improved safety on all fronts.”

He continued this safety push throughout his career, as a member of the FIA’s Medical Commission and the FIA Medical Delegate at World Endurance Championship and World Touring Car Championship events.

Now, as FFSA Medical Commission President, he is ensuring that that the organisation is at the forefront of motor sport medicine: “We have a National Medical Committee made up of 12 permanent members and other infrequent members that form the entire commission. Each motor sport event taking place in France must have a head doctor and medical security service, which is a minimum of 10 doctors and physicians per event, often more depending on the size of the event.”

Chantegret believes that becoming a Medical RTP for the FIA Institute is another major step in this pursuit for excellence. “We talked at length with the FIA Institute about becoming an RTP,” says Chantegret. “We talked with Paul Trafford, Medical Advisor to the FIA Institute, and Dr. Jean-Jacques Issermann, FFSA senate member and member of the FIA’s Medical Commission. We also sat down with FIA Institute President Gérard Saillant. We decided that the FFSA wanted to become a medical RTP in late 2013 and by January 2014 we had already organised our first extrication training event at Le Mans.”

The extrication event at Le Mans was particularly important for the FFSA. “Le Mans is a legendary race, it is a test for 24 hours and a round of the World Endurance Championship,” says Chantegret. “But it is an event where there are many risks, highlighted by the sad death of Allan Simonsen last year.”

This is why the FFSA is determined to continually strive for further improvements. As Chantegret says: “It



is a testing event because four extrication teams are involved rather than the usual two. But we now have several accredited extrication teams from the recent training event at Le Mans and we will review and re-certify these extrication teams in May to confirm the standards we expect. Le Mans is a very difficult race and we want to give maximum protection to the competitors.”

Even though these teams have demonstrated high standards in all areas, Chantegret and the FFSA are determined to push for perfection. “Extrication is important to perfect because it is the process and technique that removes a driver following a crash. A driver can be seriously injured but with proper extrication knowledge they can quickly be removed from the car without aggravating any injuries.”

For Chantegret, the advantages of becoming a medical RTP in this area are clear. “We are able to train and accredit medical staff and provide a global medical safety label, an FIA label. For the FFSA to be associated with the FIA is important as it strengthens and gives an additional quality to our work when training people to work at motor sport events.”

The FFSA already has plans to expand its reach as an RTP, after recently holding further extrication events abroad.

“Dr. Issermann went to Oschersleben to accredit German extrication teams and then Bahrain to accredit extrication teams who will be able to work at international events in their country, including the World Endurance Championship race.”

But extrication is not the only area that Chantegret wants to focus on: “Extrication is our first aim but it will be necessary that we expand to cover more general practices so that we can train all staff working on a race activity. It is a very new concept and we are still learning what are the key areas to provide training in.”

As the FFSA continues to distribute its expertise with RTP training events it will undoubtedly improve motor sport medicine worldwide. Safety in the sport has come a long way from the era of dodging between the mountains and ravines of the old Charade circuit at Clermont-Ferrand.

ANALYSIS

CHIEF MEDICAL OFFICER PROFILE:

DR. CHRISTIAN WAHLEN

As Chief Medical Officer for one of the world's most challenging race circuits, Dr. Christian Wahlen knows how important extrication skills are for any medical team.



Dr. Christian Wahlen speaking at the FIA Institute Medical Summit

For the last 25 years Dr. Christian Wahlen has overseen the medical operation at Belgium's famous Spa-Francorchamps, one of the fastest and most challenging circuits in the world. During that time he has witnessed numerous accidents first hand and dealt with the aftermath of many of those. But through continued advances in medical care and professionalism, he has been instrumental in improving safety and care at the circuit.

As a member of the FIA Medical Commission and the Chairman of the Royal Automobile Club de Belgique's Medical Commission, Wahlen's input has also been invaluable in improving medical care at racetracks globally. In this interview, He discusses his early years on the Spa medical team, how to best train extrication teams, and how he believes these skills can be improved further.

AUTO+Medical: How did you first become involved in motor sport?

Dr. Christian Wahlen: I followed my father who worked in motor sport. He took me everywhere and gave me the bug for it. Motor sport has always seduced me and my

dream was to become a driver but I chose to study medicine and specialise in surgery. After I finished my studies, it was too late to pursue my dream but over time, I have had the chance to be able to combine the love of my job with the love of motor sport.

A+M: When did you start working as a doctor on motor sport events?

CW: Soon after my studies I quickly joined the medical team of the Spa Francorchamps circuit. With the help of a number of organisers and particularly Dr. Jean-Claude Tellings, we created a strong team. The first event that I covered as a Chief Medical Officer sadly will remain with me forever. It was the 1985 1,000 km of Spa and the German driver Stefan Bellof had a horrifying accident at the Raidillon corner and sadly lost his life. It was a horrible baptism into my new role.

Gradually our programme expanded and one day FIA President Jean-Marie Balestre was surprised to find there were two separate medical teams, one for Formula One and the other for the prototype World Championship. Extrication expert Dr. Jean-Jacques Issermann was sent to clarify the situation. Our medical team was chosen and I think that was because we already understood the value of extrication. From this moment, we covered all the events taking place at Spa-Francorchamps that at the time was over 20 meetings a year.

A+M: How has the medical side of the sport changed since you first started?

CW: The medical component of motor sport has evolved greatly over the years. Even though to an extent we are still volunteers, it is imperative that we are professional, whether we are learning new skills, in training or carrying out simulations. Medical equipment has also improved year after year.

“ WE MUST ADAPT OUR MEDICAL CARE TO THE CARS OF THE FUTURE. ENERGY RECOVERY IS FASCINATING TO ME. IT IS ESSENTIAL TO BE INTERESTED IN THIS TECHNOLOGY. ”

A+M: As Chief Medical Officer of the Belgian GP, what does your job involve over a race weekend?

CW: I have the chance to lead the medical team on every meeting organized on the Spa circuit and Formula One is the ultimate event. Preparations for the Grand Prix are built up over the whole year. All the other race meetings provide a platform for our team to practice our skills and monitor our effectiveness and equipment. As Professor Jean-Charles Piette (FIA F1 Medical Delegate) has said, Spa is one of the most dangerous of all circuits. During different meetings, not all the drivers are professionals, thus accidents are frequent. On average, we carry out 15 real extrications each year. During these emergencies we can hone the skills of each member of the team and this breeds confidence. By the weekend of the Grand Prix, we just have to put the right person in the right place.

A+M: Where do you think improvements can still be made in motor sport medicine?

CW: Medical knowledge is improving each day and our sport itself is changing each day. We must therefore constantly adapt to both to ensure we are at the forefront of medical care.



The famous Eau-Rouge corner at Spa-Francorchamps

A+M: What are the latest innovations you are excited by in the area of motor sport medicine?

CW: As motor sport changes, we must adapt our medical care to the cars of the future. Energy recovery is fascinating to me. It is essential to be interested in this technology as it is my responsibility to prepare the medical team to perform its duties without putting themselves in danger.

A+M: What has been the most rewarding part of your role on the FIA Medical Commission?

CW: I have been a member of the FIA Medical Commission for 25 years now. In the beginning I had the opportunity to work with Professor Sid Watkins who did so much to advance medical care in motor sport. Professor Gérard Saillant then took over and has done a great job. The Commission meets frequently and is surrounded by many experts. The agenda is always full. Every Member or guest of the Medical Commission can easily speak, he will be heard and his opinions will be taken into consideration. It is like being part of a big family.

A+M: Why is extrication such a valuable skill for medical teams to be skilled in?

CW: I have to pay tribute to Dr. Jean-Jacques Issermann who, for me, is the father of extrication. Without him, extrication would not have become this major link in the chain of medical rescue organization.

If you have a cohesive team, well equipped and trained throughout the year, they will be able to deal with every circumstance. You must start by providing them with material so that they can be trained. Through perseverance, I have managed to acquire two Renault F3.5 chassis for open cockpit training and for closed cockpit training we now have an Audi A4 and rally car chassis. These are stored in a garage dedicated to extrication and this allows teams to train and hone their skills year round. With this environment we can create a variety of different scenarios.

A well-prepared team will have the best chance to make a correct extrication when they are immersed in real racing conditions. Extrication days organized by the FFSA have become international events and a number of Belgian teams have been involved in these.

The teaching quality of these days is amazing and this is understandable as they are overseen by the FIA Institute. All the extrication teams that went to Le Mans in January know the benefit of high quality teaching and having a multitude of training resources at their disposal.

A+M: How has the Royal Automobile Club de Belgique improved its approach to safety in your time as a member?

CW: The RACB was one of the first ASNs but it is still very dynamic. We have a number of active members across many FIA commissions.

It is the duty of an ASN to place its members in optimal conditions of security and therefore it is normal that all the stakeholders receive quality, continual training. The medical commission of the RACB that I chair is involved heavily in this.

A+M: What is the most important lesson you have learnt working in motor sport medicine?

CW: Motor sport is a difficult world to get in to but when you are adopted you become a member of one big family.

A+M: How important are volunteers when it comes to keeping competitors safe on the track?

CW: Volunteers are essential at all levels of motor sport and they should be respected and valued for that.

A+M: How useful is the FIA Institute's F1 Extrication Simulator for medical teams and volunteers to practice on?

CW: The Institute has developed a chassis allowing the teams to master open car extrication through the removable seat. The chassis is well made and is constantly improving. I believe every ASN must acquire use of the chassis and let their extrication team practice with it.

“ EVERY MEMBER OF THE MEDICAL COMMISSION CAN EASILY SPEAK, HE WILL BE HEARD AND HIS OPINIONS TAKEN INTO CONSIDERATION. IT IS LIKE BEING PART OF A BIG FAMILY. ”

THE ROAD BACK:

ANTHONY DAVIDSON

In this regular section, AUTO+Medical speaks to professional drivers about how they have dealt with serious injuries in their careers. Here, former F1 star and current WEC Toyota driver Anthony Davidson talks about recovering from his crash at the Le Mans 24hr race in 2012.



AUTO+Medical: What was the extent of your injuries following your crash at Le Mans?

Anthony Davidson: I suffered a compression fracture to my T11 and T12 vertebrae of around 25-30 per cent. I didn't suffer any concussion or any other injuries.

A+M: What happened in the direct aftermath of the crash?

AD: The first thing I did was to wiggle my toes and move my legs, as I was aware straight away that I had suffered a back injury. I then opened the driver's door, disconnected my drink and radio system and turned the cars power supply off. I didn't contact the team on the radio beforehand. After catching my breath and calming down I slowly undid the seat belts and pulled myself out of the cockpit as I was beginning to feel like I needed to lie flat on my back instead of the hunched position I was in. I managed to do this without causing any extra pain by using my arms rather than my legs or core muscle group. I realised by this point I needed medical attention and that walking was probably out of the equation so I began to wave my arms to call for help. The first people to arrive were some marshals who seemed reluctant to help and unable to communicate. They didn't make physical contact with the car either as I believe the Hybrid lights were red. Medical care arrived shortly after, probably around 5 minutes later. A neck brace was fitted despite



During the accident, Davidson's hybrid Toyota collided with Piergiuseppe Perazzini's Ferrari at Mulsanne Corner. The Italian walked away from the accident but Davidson's car somersaulted before crashing heavily into the tyre barrier.

my protests, as I knew my neck wasn't in pain at all but I couldn't communicate. I asked for morphine as the pain was building but pain relief didn't come for a further 5-10 minutes by which point I was starting to panic that it would never come.

A+M: What were your thoughts at the time, as you were in the hospital?

AD: By the time I was in hospital I felt a bit more relaxed, and was pain free thanks to the drugs but mentally was worried about the severity of the injury because of the doctors comments at the side of the circuit, telling me "This is your life" when I asked not to have the neck brace fitted. Also after I reported a few tingles down my legs in the medical centre at the circuit, which seemed to cause a bit of panic, and in turn stayed with me right up until the hospital scan results came through - when I was told there would be no need for surgery.

I was very impressed with the level of care I received at the hospital.

A+M: How did you feel as you began your rehabilitation?

AD: I was amazed (and a little concerned) when I was asked to stand up and walk after only a few days, but the corset – which was brilliantly made – gave me immediate confidence. I found a good company back in the UK to start the rehab process and with every week that passed the pain went down and my movement returned. I was continuously challenged throughout and encouraged to push myself to regain confidence. After six weeks (and an MRI scan) the corset was off and I was asked to bend over and touch my toes, which felt like a huge step forward and was completely pain free.

By this point I remember believing I would be able to drive again if I wished. I was probably more scared of not being able to drive again than anything else so I got into a go-kart a few



Davidson has made a succesful return to the track

weeks later just to prove it to myself, (encouraged by my phsio) which was the biggest confidence boost I could have hoped for.

A+M: Did you always want to return to racing or were there moments of doubt?

AD: I was positive the entire way until the night before I actually stepped into the DP car at Daytona '13. The relief I felt after my first few laps when I realised it didn't hurt and that I wasn't scared was huge.

A+M: How did you manage to regain your race sharpness before returning to the Toyota line-up?

AD: Competing at the Daytona 24hrs at the beginning of the year was the best part of my rehab process in terms of mental wellbeing. I also had a few more go-kart outings in between.

The first time I stepped into the Toyota at Paul Ricard was as if I had never been away. The lap times were good straight away and again not one bit of pain (using the same seat that I had the crash in). It was only at that point though that I knew 100 per cent I was able to enjoy driving again, rather than using it as a stage of rehab.

A+M: What were your thoughts when you returned for your first race back in the cockpit?

AD: I remember being scared that I might feel pain and that I wouldn't know what to do if I did. I still felt a bit more like a patient than a racing driver at Daytona when I turned up, but that feeling soon went away after a few laps.

A+M: Are there any improvements you feel could be made in drivers care, either immediately post accident or in the rehabilitation period?

AD: A better understanding of the Hybrid technology from the safety marshals would be good, and doctors that can communicate with drivers is a must.

SCIENCE

SCIENCE

SPINAL INJURIES AND MOTOR SPORT

*FIA Institute Medical Advisor **Dr Paul Trafford** along with FIA Institute Fellows **Dr Michael Henderson** and **Dr Terry Trammell** examine the science behind spinal injury in motor sport and the latest research being undertaken by the FIA Institute to help prevent such injuries*



INTRODUCTION

Spinal injuries can be life changing for anyone but especially a race driver. Even minor injuries can finish a career.

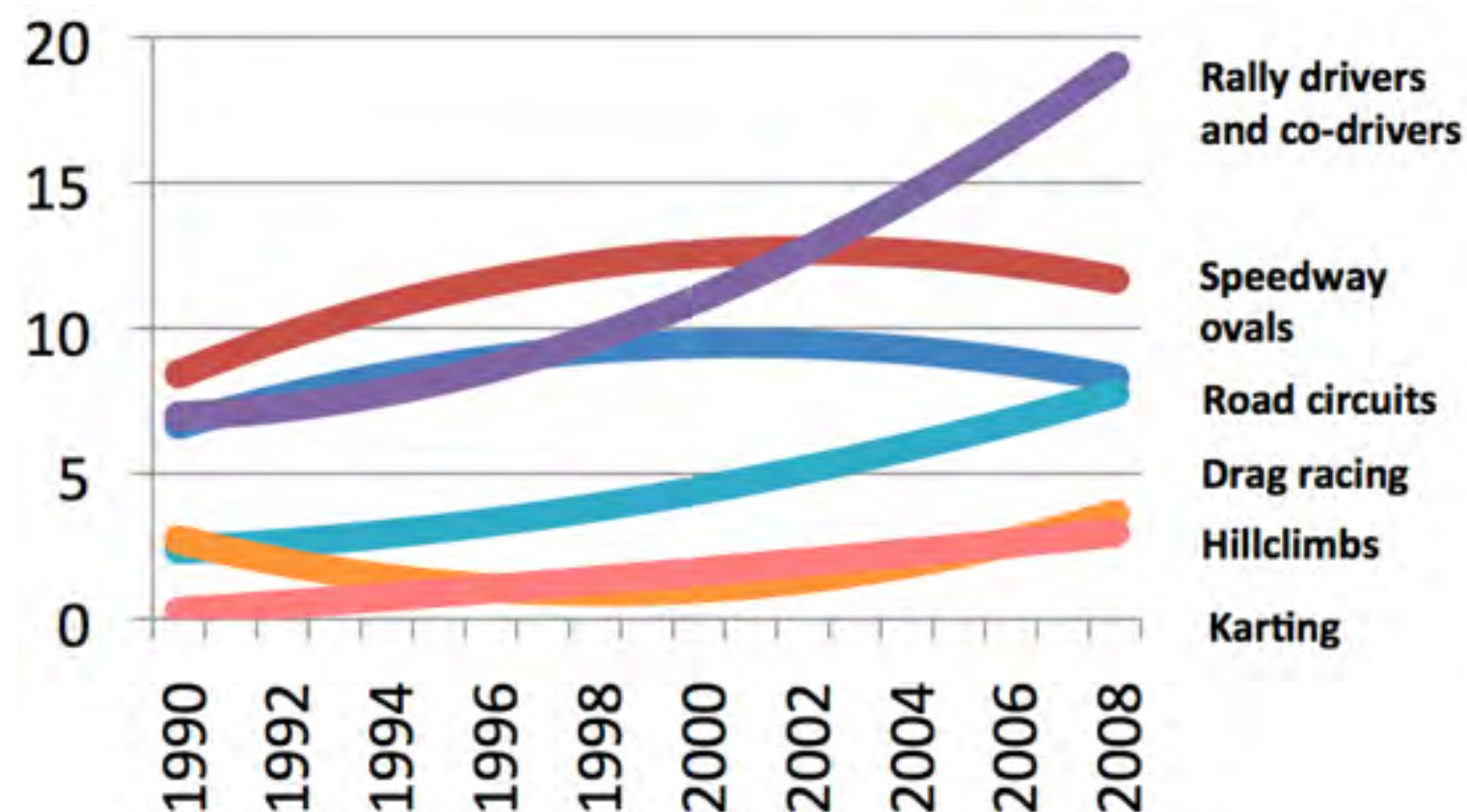
At best, an injured competitor can expect several weeks of rest, being unable to drive, whilst the long-term consequences of more serious injuries can be devastating.

Data in this area is limited due to confidentiality issues but it is still clear that spinal injury is a major problem in motor sport. Estimates of up to 60 deaths a year in motor sport worldwide have been made by Dr Michael Henderson (1) using published obituaries as the source of information (fig 1). However this number may be much higher as it is unlikely to have captured all the data; furthermore we are unable to classify the actual injuries responsible for these fatalities.

The global-incident rate (2007) for Traumatic Spinal Cord Injuries (TSCI) in the general population is estimated at 23 cases per million (179,312 cases per annum). The incidence in North America is 40 per million, Western Europe 16 per million and Australia 15 per million; with road car crashes accounting for up to 50 per cent of TSCI in the general population in the USA (2, 3).

Whilst the incidence of TSCI in motor sport is thought to be low, recent anecdotal evidence and feedback from the FIA National Sporting Authorities (ASNs) has revealed a number of spinal fractures to be occurring in motor sport across all disciplines and all ages. This has led the FIA Institute, at the request of the FIA, to commit to a major research project in 2014 looking at the incidence and mechanism of spinal injuries in motor sport.

FIGURE 1: ANNUAL MOTOR SPORT FATALITIES WORLDWIDE 1990 – 2008 BY COMPETITION CATEGORY
Fatality data from www.motorsportmemorial.org (second order polynomial trend)

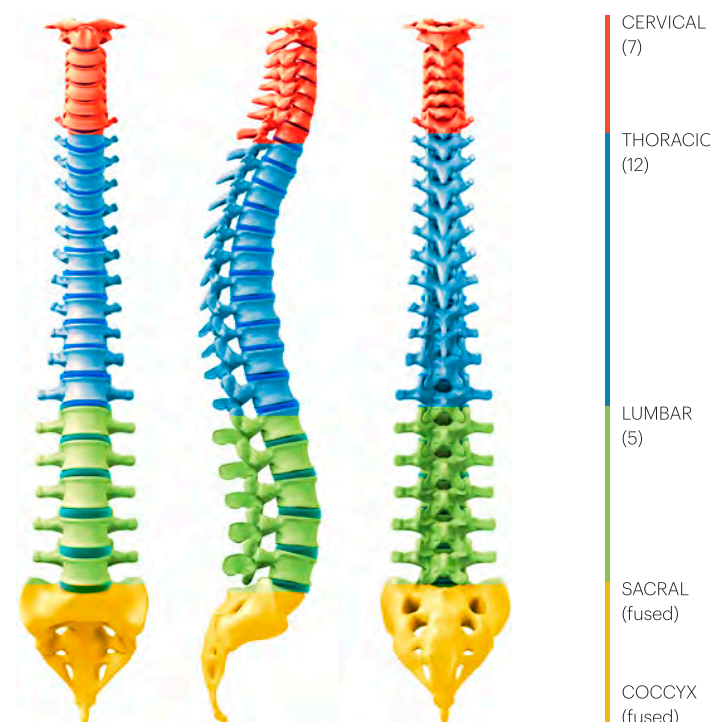


And it is not just drivers at risk. Recent data from the World Rally Championship, courtesy of FIA Permanent Medical Delegate to WRC Dr Jean Duby, shows that co-drivers are more at risk in rallying, with a ratio of almost 2:1.

TABLE 1: DATA ON SPINAL INJURIES IN WRC 2011, 2012, 2013 AND 2014
courtesy of Dr Jean Duby

YEAR	DRIVER	CO-DRIVER	LEVEL
2011	A		Not Recorded
		B	Lumbar
		C	Not Recorded
	D		Cervical
		E	L4
		F	L1
2012	G		L1/L2
		H	L4
2013		J	Not Recorded
		K	Not Recorded
2014	None		T4/T5/T6

FIGURE 2: THE SPINAL COLUMN
Showing the different regions



COMPLEXITY

The spinal column is a complex structure of interlocking vertebrae, held together by ligaments and muscles. This allows rotation, flexion and extension, whilst giving protection to the spinal cord itself. It is capable of absorbing energy and withstanding huge forces, with discs between individual vertebrae acting as “shock absorbers”.

The vertebrae are joined together in a column, with the skull at the top and the pelvis at the bottom. Twenty-four vertebrae articulate; the lower five are fused to form the sacrum, and the bottom two are fused to form the coccyx. The cervical region consists of seven vertebrae, the first two of which are known as the atlas and axis and have a different shape to support the skull. The thoracic region has 12 vertebrae, each with a rib attached and the lumbar region has five (fig 2).

There are a series of curves in the antero-posterior plane which contribute to its stability (fig 3).

FIGURE 3: THE NATURAL CURVATURE OF THE SPINE
Cervical, Thoracic, Lumbar and Sacral Curves

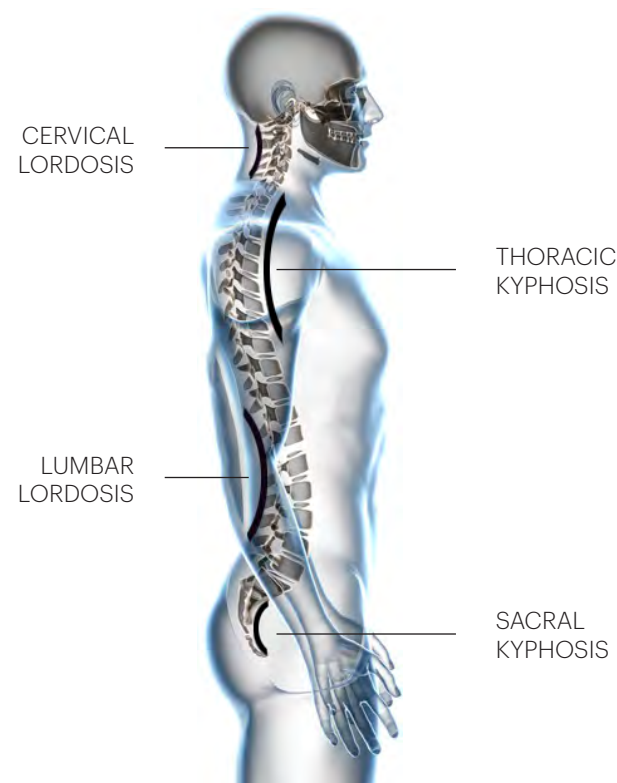


FIGURE 4: SEATING POSITION F1 40° FROM HORIZONTAL
High legs and feet, spine flexed

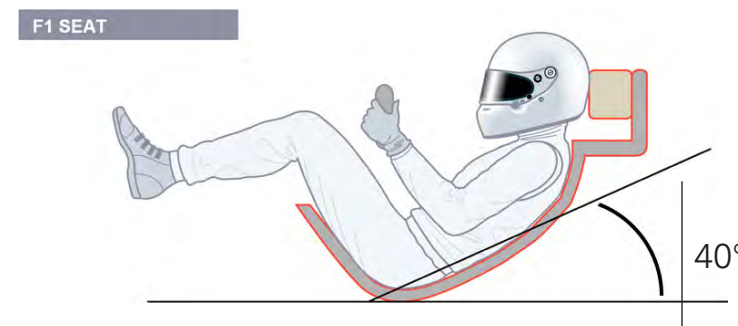


FIGURE 5: SEATING POSITION IN LMP - 50° FROM HORIZONTAL
Lower legs and feet, spine flexed

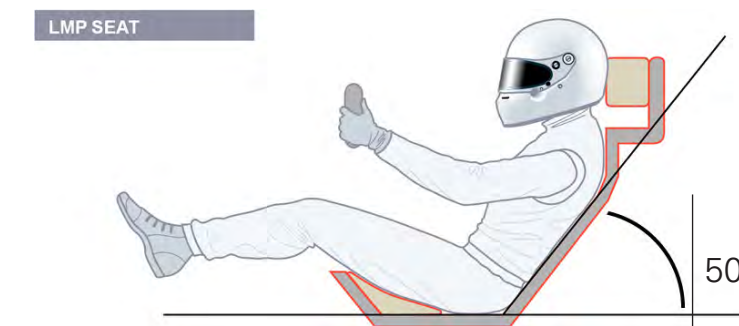


FIGURE 6: SEATING POSITION WRC - 80° FROM HORIZONTAL
Upright spine

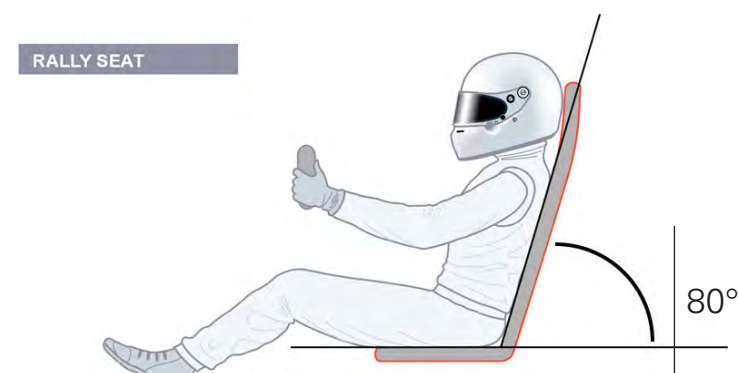
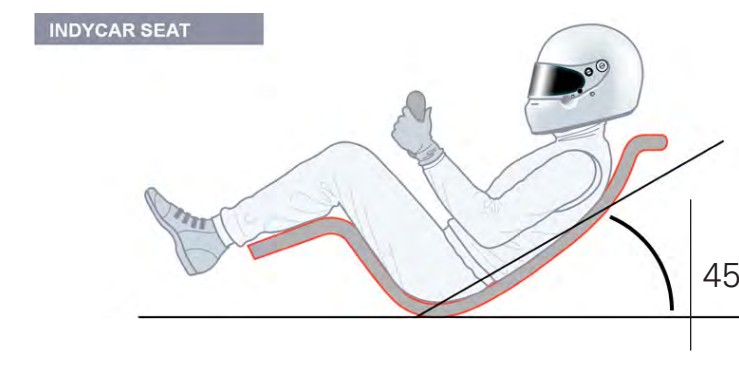


FIGURE 7: SEATING POSITION INDYCAR 45° FROM HORIZONTAL
Lower legs and feet compared to F1



SEATING POSITION

In motor sport the competitor sits in a purpose-built seat, often designed specifically for that type of vehicle and usually held in position by a harness. There are some obvious exceptions, such as karting and historic vehicles.

The seating position, although very specific to the vehicle, is difficult to define generically. This is because there is no consistently accepted way of measuring the seating angle, as the curvature of the seat varies from series to series. However it is an important parameter as the natural curvature of the spine contributes to its stability; therefore anything

that compromises this, such as the reclined seating position in a race car, with a flexed spine, may be a significant factor.

An estimate of the angle of the seating position ranges from 40° from the horizontal in F1 with high legs and feet (fig 4), through the less reclined 50° of LMP, with lower legs and feet (fig 5), to the almost upright position of WRC, WTCC and other closed cars at 80° from the horizontal (fig 6)(4). The natural curvature of the spine becomes compromised when various reclined seating postures are adopted, often with an artificial kyphosis introduced in each area, with reversal of the normal cervical



and lumbar lordosis into a kyphosis and accentuation of the thoracic kyphosis, resulting in a focus at the point of maximum curvature, where any axial load will apply. This is a factor in dictating the level of spinal injury

FIGURE 8:

Driver seated in an Indy Lights chassis with cut away seat to show the customary semi reclined position. The seating angle in Indy Car is approximately 45° from the horizontal, with a similar position of legs and feet to that seen in LMP (fig 7). Note the x-ray plate on the drivers far side, which helped Dr. Trammell to examine the spinal position (5).



In all cases the vehicle design dictates the seating position, with the spine often being out of its normal contour; furthermore, competitors do not always adopt the optimum position giving the most support to the spine, or make best use of their safety equipment. The FIA Institute published A Driver's Guide to Safer Motor Sport in an effort to make young competitors more aware of their racing environment (6) and the FIA Institute Young Driver Excellence Academy stresses to young competitors the use of their safety equipment and the importance of the correct seating position.

MECHANISM OF INJURIES

There are numerous classification systems, considering morphology of the radiological appearance, the integrity of the posterior spinous ligament and neurological status (7, 8) but a simple system may

consider compression fractures, flexion-extension-distraction injuries and rotational injuries. A figure of 2,000 to 6,000 Newtons of force is cited as that required to fracture the cervical spine (9), depending on the nature and direction of the ap-

FIGURE 9: LUMBAR COMPRESSION FRACTURE



plied force; whilst 6,000 Newtons may produce a compression fracture of the thoracic and lumbar spine (7, 10, 11).

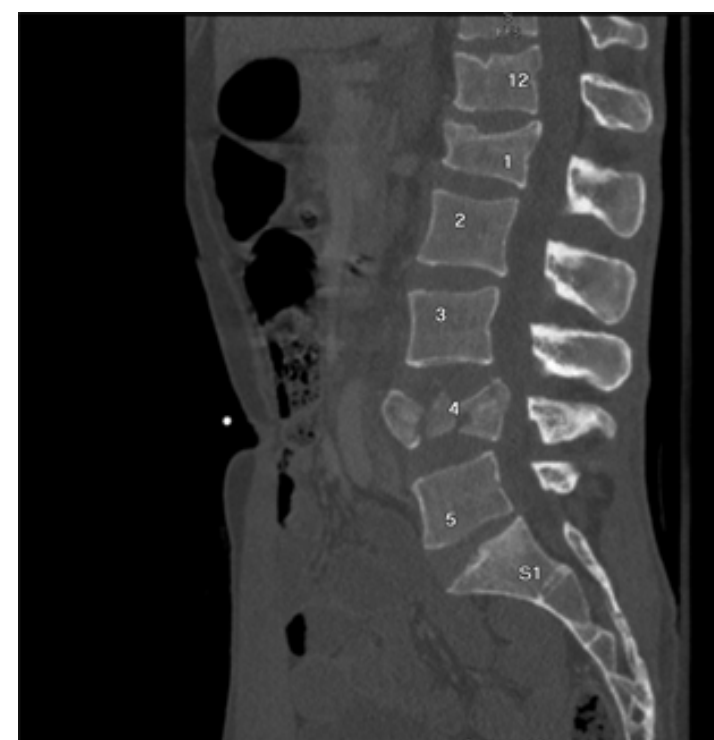
Force is a function of mass and acceleration, so that crashes that generate high levels of acceleration – ‘g’ may result in injury. The human tolerance for spinal injury is $60g \leq 3ms$, such that an acceleration/deceleration of 60g applied for greater than 3ms is likely to result in injury (12). It has been estimated that in tension (the force pulling the spine apart), the spine can only endure ≤ 3860 Newtons, whilst in compression (the force squashing the spine) ≤ 7140 Newtons. Furthermore the lumbar region can withstand more compression than the thoracic (7, 13). Much of this data is from cadaveric and mathematical modelling studies. Real-world studies of open-wheel single-seat racing cars have shown that young healthy drivers can withstand higher accelerations and loads, which indicate a threshold for spinal fracture of 6,500N and an axially applied load along the spine of $> 20g$ for compressive failure or fracture.

One of the most common spinal bony injuries seen in motor sport is the crush or wedge fracture, where the body of the vertebrae has been crushed, often producing a wedge shape on a lateral x ray (fig 9). Whilst these are often stable, they can be very painful and require a period of withdrawal from racing, having a profound effect on competitors of any age or level of competition. This is the most common spinal injury in rallying and a classic injury for co-drivers. It results directly from an axial load resulting in compression of the spinal column in the upright seating position (fig 6), the compressive load being focussed in the lumbar region. For those in the more reclined seating position (figs 4, 5 and 7) where the natural anatomical curvature of the spine has been compromised, mid-thoracic fractures have become more evident. These were found to occur most commonly in rearward direct impacts. They also occur in drivers whose cars have been launched and land hard. The mechanism of these injuries has been extensively studied in Indy Car (13, 14)

where rear impacts are more frequent and a mechanism postulated by Viano (15). The knowledge gained here has allowed measures to be taken to lessen the occurrence of these fractures in this series with success. Spinal fractures resulting from forward impacts are less well understood, even in road cars (17), and further research is required particularly with regard to the interaction with the seat and harness. It is already well established in road accident research, however, that even in a purely frontal impact, a restrained occupant in an upright seating position can sustain compression fractures in the thoracic and lumbar regions of the spine. (fig 10). The loading is applied by the base of the seat, and appears to be more likely with the firmer seat bases used in modern cars to limit the risk of submarining under the lap belt. This can also be due to buckling of the floor pan. Lumbar fractures are more common in this scenario and are more commonly “burst” fractures. There is a frequent association with fractures of the hindfoot.

FIGURE 10

This is an example of an L4 “burst” fracture sustained in a high speed frontal impact. There is an old compression fracture of L1 sustained in a previous accident



OSTEOPOROSIS

Osteoporosis may be a factor in certain cohorts, notably women, the elderly and those from certain geographical regions. The World Health Organisation (WHO) defines osteoporosis as bone density that is 2.5 Standard Deviations (SD) below the young adult mean value. Decreased bone density results in an increased risk of fractures; every 1 SD decrease in the bone density of the spine increases the risk for new vertebral fracture by factor of 2.0 to 2.4. (17). Although little is known about the risk in motor sport, a WHO report in 1994 cited the lifetime risk for vertebral fractures in women age 50 at 15.6% compared to men age 50 at 5% (18). This is an area that we should consider, as more women become involved in motor sport and as the age of competitors increases.

FRONTAL HEAD RESTRAINTS

In 1999 following a number of fatal distractive base of skull fractures in the US, the Head and Neck Support (HANS) was introduced into Indy Cars and other

American championships, followed by F1. It is now mandatory in all FIA Championships and has also been adopted by many ASNs for National Championships, but sadly has not yet been universally adopted. This has had a profound effect in the reduction of basilar skull fractures in frontal impacts. Its introduction and use has also been associated with a reduction in the number and severity of cervical fractures although this is an unintended serendipitous consequence. Many Frontal Head Restraint systems are now being adopted voluntarily by competitors, which can be very confusing to rescue workers who may never have seen these until trackside at the accident. The seating position, the support given by the seat, the type of foam used and the harness all have a significant impact on the stability of the spine in a race car. These have been and continue to be evaluated by the FIA Institute as well as IndyCar and NASCAR in the United States and currently the subject of an extensive advanced programme being undertaken by the FIA Institute.



EXTRICATION

A competitor with a spinal injury presents a major problem for the medical and rescue services at events. This may be an isolated injury with no other obvious injuries, or more commonly is associated with a degree of concussion and other injuries. We now consider extrication to be performed either in a controlled manner or as an emergency, depending on circumstances. In both cases, the car may have to be cut apart, a process known as disincarceration

TERMINOLOGY

EMERGENCY EXTRICATION
(formerly known as rapid or urgent extrication) where the driver's condition is unstable, there are serious medical problems, or other factors such as fire, a competitor must be extricated as quickly as possible.

CONTROLLED EXTRICATION
(formerly known as planned or routine extrication) where the medical condition of the driver is stable and there are no external factors such as fire and the time is less critical.

DISINCARCERATION
is the physical act of cutting the car apart to allow extrication.

At FIA World Championships on circuits we have dedicated Extrication Teams of six people consisting of a doctor and five others (19). Dr Jean Jacques Issermann, Special Adviser to the FIA Medical Commission President, has dedicated a lifetime of work to developing and refining the extrication teams, their training, assessment and role within the FIA Medical Team. This team is responsible for removing the driver from the car as rapidly as circumstances allow. For WRC and other off road events there is no extrication team and the co-driver or driver may have to get his partner out, either alone or with the help of

other competitors or marshals. For this reason the FIA Medical Commission has supported an initiative by Dr Jean Duby where all competitors at WRC level are taught First-On-Scene training including the Rautek manoeuvre, a novel method for one competitor alone and without assistance, to extricate another (20). The aim of extrication is to get the driver out without making anything worse and usually involves stabilising the spine in the vehicle using a Kendrick Extrication Device designed by Richard Kendrick in 1978, (21) or the removable Lear type seat (22) as used in F1 and other open cockpit championships, and a cervical collar. However many of the extrication practices undertaken at motor sport events, including use of the KED are identical to those used by the paramedics and emergency services for road vehicles, and were devised years ago before many of the current safety systems were in place. Furthermore the level of safety equipment in many race cars far exceeds that available to the road car driver, particularly the helmet and HANS, the harness systems and the seat which together with the design of modern race vehicles imparts a degree of protection far exceeding any road vehicle. The mechanism of a crash has been shown to be an unreliable indicator of spinal injury (23) and there is a growing consensus, where a competitor is alert and has no evidence of concussion or other injuries, for an experienced doctor or paramedic to allow self or assisted extrication, rather than undergo formal extrication using spinal splints. This is obviously after the doctor or paramedic has talked with and examined the driver. Even where a spinal injury has occurred, the self-immobilization that takes place as a result of muscle spasm, pain and oedema may well give better immobilization than a KED and other devices. Further, the KED, Cervical Collars, Spinal Boards and other splints are not without their problems (24, 25, 26, 27, 28). Mark Hauswald (29, 30, 31) gives a very convincing argument for this concept. The Cochrane collaboration (32) could not find any randomised controlled trials of spinal immobilisation strategies

in trauma patients. Recently Engsborg et al (33) used video motion capture analysis to look at spinal movement in those being extricated from road cars, concluding that the use of certain methods of protection actually gave no decrease in spinal motion compared to self-extrication with a cervical collar. This supports work undertaken by Trafford at the FIA Institute, where spinal motion sensors were used during unassisted and controlled extrication of volunteers from open cockpit cars. Initial data supports the use of a cervical collar and assisted self-extrication (34). Many others involved in motor sport also favour this approach. The US motor sport orthopaedic specialist Terry Trammell presented a review of all spinal injuries and extrications in Indy Cars between 2006 and 2011 at the International Council of Motor Sport Science in Indianapolis in 2013 (35). He concluded self-extrication should be allowed where certain criteria had been met and selective spinal immobilization should be adopted (7, 36, 37). Trammell also made the point that in the US every driver undergoing formal extrication had to be immobilized and transferred to a level 1 Trauma Centre where a Pan-Scan or whole body CT was performed, exposing the competitor to significant levels of radiation with increased lifetime risk of cancer mortality as outlined by Brenner (38). This is an area where our practice and research in motor sport can have widespread consequences for road users and emergency services; obviously further work needs to be undertaken in this area.

RESEARCH

The spine is a very complex structure, which is difficult to represent as a simple mechanical model. The understanding of the forces and contributing factors responsible for spinal injury in motor vehicles is not well understood, despite considerable research taking place. Motor sport is in a unique position with access to many research tools and extremes not seen in road vehicles, yet is lacking in not having significant historical data available.

The FIA and FIA Institute have committed to a major integrated research programme led by engineers and doctors, looking at spinal injury, seat design, harness geometry and spinal movement during extrication. A comprehensive review of all data available is being undertaken and all the incident data collated. This involves accessing all the data held by the FIA, FIA Institute and various ASNs as well as individuals. At the same time a thorough review of all the literature relevant to spinal injuries in motor vehicles is underway. Following on the work of Trammell, the seating position and curvature of the spine in racing seats is being closely analysed using computer simulation models and various imaging techniques including advanced MRI scanning of seated competitors. The Accident Data Recorder (ADR) programme is also being interrogated for information that can be used to assist in simulation models. This work promises to give some exciting results to help in future seat design as well as allowing us to optimise materials used and harness geometry. Both opinion and measurements of spinal movement during extrication has confirmed, in the work undertaken so far, the concept of the self-extricating driver being able to stabilise their own spine better than using collars and splints; however much more needs to be done in this important area where collaboration with those involved in road vehicle accidents may bring benefits for both motor sport and road vehicle users. The new FIA Accident Database, which is currently under trial with several ASNs, will allow data to be collected on a worldwide level for both FIA Championships as well as National Racing Series; all doctors involved in motor sport should engage with this and help us to identify trends so we can respond and make our sport safer. Our aim is to achieve a better understanding of the mechanisms involved in producing spinal injury in competitors, learn more about the contributing factors, and make recommendations concerning seat design, seating position, and subsequent medical intervention following injury.

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ROLE OF THE FIA MEDICAL COMMISSION

The FIA Medical Commission plays a central role in the development of the latest medically-focussed regulations in motor sport

The various FIA Sporting Commissions assist the World Motor Sport Council in its decision making process. One of these Commissions, formed under Article 22 of the FIA Statutes, is the FIA Medical Commission.

The Chairman of the Medical Commission is Prof. Gérard Saillant, who is also the President of the FIA Institute, and the Deputy Chairman is Prof. Jean-Charles Piette, who is also the FIA F1 Medical Delegate.

The role of the FIA Medical Commission, which meets in Paris three times a year, is to advise the FIA President and put forward regulatory proposals to the World Council, and consider matters raised by its members. Other Commissions such as the Safety Commission may refer items requiring a medical input and similarly the FIA Medical Commission may ask advice from, or refer items to the other commissions. It is also involved in the doping control regulations.



APPENDIX A, APPENDIX H AND APPENDIX L

The Medical Commission is responsible for updating information contained in these appendices as often as necessary to ensure the most recent advances in medical and safety measures are included.

Appendix A – FIA anti-doping regulations, includes:

- Anti-doping rules in conformity with the World Anti-Doping Code of the World Anti-Doping Agency

Appendix H – Supervision of Road and Emergency Services, includes:

- Organisation of medical service at circuits, rallies or other events
- The FIA International Event
- Medical Questionnaire
- Role description and required qualifications of CMOs
- Conception, equipment and staffing of permanent Medical Centres
- Medical intervention procedures in case of accident
- Medical intervention vehicles, equipment and personnel
- Casualty extrication teams
- Doctors at medical posts
- Evacuation of the injured

This appendix also covers: fire and extrication services (cautionary yellow flag), race neutralisation (Safety Car) and race suspension/race stoppage (red flag) – all of which facilitate safe and efficient emergency intervention.

Appendix L – International drivers’ licences, medical examinations of drivers, drivers’ equipment

and conduct, including:

- Obligatory annual medical examination (to assess aptitude).
- Medical examination following an accident or physical disorder.
- Reintegration procedures (after illness or injury).
- Regulations for physiological studies during motor sport events.

This appendix also covers requirements for competition licences, personal protective equipment requirements and driving code of conduct – all of which minimise risk of accidents and their consequences.

FIA Sport, with the research expertise of the FIA Institute, implements these regulations and recommendations at FIA Championship level, relying largely on the services of FIA appointed inspectors, Race Directors and Medical Delegates, whose remarks and suggestions are relayed to event organisers through the ASNs before, during or after an event. Continued inscription of events on the FIA International Calendar often depend on the findings in these reports.

The FIA Championships provide the benchmark for FIA sanctioned international series and other international and national events, all of which are overseen by the ASNs of the territories in which they take place. The FIA has the authority to intervene if it becomes evident that standards are being ignored.

One way in which this supervision is exercised is by requiring organisers to submit reports to the FIA after any significant accident.

This information, in turn, serves to test the validity of current medical and safety measures and to develop new strategies and techniques.

The Medical Commission works closely with other FIA Commissions and the FIA Institute.

For further information on these:
<http://www.fia.com/sport/regulations>

FIA INSTITUTE MEDICAL ADVISORY PANEL (MAP)

The FIA Institute Medical Advisory Panel (MAP) was established in 2011 and Dr Paul Trafford appointed as Medical Advisor to take the medical programme forward. The role of the MAP is to harmonise the work of the FIA Institute more closely with the FIA Medical Commission, undertaking those medical projects that were considered important by both the MAP and the Commission, whilst also keeping the Commission updated with various research projects.

There are several Fellows of the FIA Institute, experts in motor sport safety with extensive experience and strong track records in this field. Their expert advice can be called upon by any of the FIA Institute’s Research Groups; The Closed Car Research Group (CCRG), The Open Car Research Group (OCRG) and the Karting Research Group (KRG).

A good example of the way the FIA Medical Commission and FIA Institute Medical Advisory Panel work together is the development of the FIA Institute F1 extrication simulator. The subject of extrication and teams getting experience outside FIA Championship events was discussed at the FIA Medical Commission and the proposal for some sort of training tub was raised. Paul Trafford took this idea forward to the MAP and using the resources of the Institute and the support of Prof Gérard Saillant, the FIA Institute F1 extrication training simulator was developed, built, distributed and made available to circuits around the world within a few months.

FIA MEDICAL COMMISSION MEMBERS

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Prof. Gérard SAILLANT (FRA), FIA Institute President
DEPUTY PRESIDENT
Prof. Jean-Charles PIETTE (FRA), F1 FIA Permanent Medical Delegate

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Dr Ian ROBERTS (GBR), F1 Rescue Coordinator
Dr Alain KIND (FRA), Medical Director, Le Mans Series
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Dr Paul TRAFFORD (GBR), Medical Adviser, FIA Institute

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OBSERVER
Jean DUBY, Medical Delegate WRC

SECRETARIAT
Gus Glover, Director of Education, FIA Institute
Emma Hale, Education Co-ordinator, FIA Institute

UPCOMING EVENTS

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|--------------------|---|
| 24-27.06.14 | FIA SPORT CONFERENCE WEEK, MUNICH |
| 26.06.14 | FIA WORLD MOTOR SPORT COUNCIL, MUNICH |
| 02.09.14 | FIA INSTITUTE MEDICAL ADVISORY PANEL, PARIS |
| 04.09.14 | FIA INSTITUTE RESEARCH COORDINATION GROUP, PARIS |
| 11.09.14 | FIA WORLD MOTOR SPORT COUNCIL, BEIJING |
| 18.10.14 | FIA MEDICAL COMMISSION, PARIS |
| 12-14.11.14 | FIA PAN-AMERICAN MEDICAL CONFERENCE, ACAPULCO |
| 1-3.12.14 | MEDICAL SUMMIT/CMO SEMINAR, DOHA |