



MOTORSPORTS EMS: AN EMERGING SUBSPECIALTY

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“Car 3 just hit hard into Turn 1. Dispatch Turn 1 fire and ambulance now!” the radio crackles from race control as an Indy Car traveling more than 240 mph nearly disintegrates before your eyes. Within 15 seconds of the accident, your ambulance and a fire crew are on scene confirming there’s no fire threat, evaluating the driver’s condition and clearing a path for the other race cars through the half-mile of debris. The driver is alert and oriented to person, place, time and event without any other complaints. The driver removes his head and neck support (HANS) and safety belts and climbs out of the race car (see p. 100).

AP WIDE WORLD PHOTOS/TOM PYLIE



Dan Wheldon's car goes airborne after it hit the wall in the third turn, as Scott Dixon drives past during the Indianapolis 500 on Sunday, May 25, 2003. Wheldon, from England, had no serious injuries.

Inset: NASCAR driver Jerry Nadeau, of Danbury Conn., is extricated from his car on a backboard after a crash during practice for the Pontiac 400 at Richmond International Raceway in Richmond, Va., Friday May 2, 2003. Nadeau was taken to a local hospital by helicopter.



As you assist the driver to your ambulance to transport him to the Infield Care Center for physician evaluation, a tow truck is already hooking up the car, the safety team is cleaning up spilled oil, and the last of the debris is cleaned up. This all happens over the length of a typical commercial break, and “We are back to racing!”

Motorsports is the fastest growing professional sport in the United States.¹ Each year approximately 14 drivers die in crashes, while many others are paralyzed or seriously injured. Surprisingly, 27% of those killed at auto racing events are track workers, spectators and journalists.² Due to racing’s unique environment, a traditional approach to EMS can be ineffective and expose drivers, spectators and prehospital personnel to greater danger.

Motorsports venues increasingly recognize the need to have highly trained emergency medical personnel on scene during events. To meet these needs, selected prehospital personnel and emergency physicians receive training specific to working with and supporting various racing venues.

Many factors make motorsports EMS unique:

1. Medical personnel must navigate racetracks simultaneously with speeding cars, boats or motorcycles;
2. Medical personnel must be knowledgeable about numerous vehicle configurations,



PHOTO JEFF T. GRANGE, MD

In general, it’s difficult to obtain an advanced airway while a driver is still in their vehicle. Innovative techniques and devices, such as the nasal trumpet, can help in these situations.

crash characteristics, sanctioning body rules and fuel characteristics;

3. Environmental factors, such as heat and safety equipment, can uniquely affect patient care. *Examples:* During long, hot races, drivers can become dehydrated and near syncopal. Drivers have been found to lose more than 5 lbs. during a race due to fluid loss. Some drivers require IV fluids and ice-soaked towels following such a race. Much of the new safety equipment intended to prevent significant movement in the cockpit has made it more difficult to provide medical care in the car due to space constraints.
4. Medical personnel may need to provide patient care in a potentially dangerous environment, such as near speeding trucks during an off-road desert race;
5. Medical personnel require specialized training in extrication and packaging of patients from various types of race vehicles, such as Indy Cars, stock cars, motorcycles or boats;

6. Drivers have an increased tendency to refuse necessary medical care due to their vested financial and emotional interests in the race;
7. Medical personnel may have unique time restraints imposed on them due to the event being broadcast live on television; and
8. The decreased “incident to patient assessment” time interval may initially prevent the recognition of serious injuries due to the lack of time for bleeding and swelling to take place and adrenaline to subside.

Although there are many types of motorsports, such as stock cars, open wheel cars (Indy Racing League, Formula One, CART, Sprint Car Racing Association, etc.), dragsters, off-road trucks and buggies, go-karts, motorcycles (on-road and off-road), mud racing vehicles, monster trucks, boats and planes, this article deals primarily with auto racing. Motorsports venues may include permanent, paved oval or road courses, temporary street circuits, dirt tracks, stadiums, deserts, lakes, oceans, etc.

Each form of motorsports and venue type has specialized fire, safety and rescue issues, techniques and equipment. There is currently little in the medical literature or elsewhere to assist one with planning or providing care during motorsports events.

To indicate that they’re OK, drivers in open cockpit cars remove their steering wheels and stock car drivers are instructed to put their window nets down after a crash.



PHOTO JEFF T. GRANGE, MD

In this article we review the various types of motorsports, how to plan for an event, common misconceptions, unique patient care considerations and the future of the evolving subspecialty of motorsports EMS. Although many motorsports events involve mass gatherings, this article focuses primarily on the unique aspects of providing medical care for the participants.

Planning

The most important part of any motorsports event is the planning stage. Your medical action plan (MAP) should outline specific details about the organization and delivery of emergency medical care at each specific race. It should be based on a combination of experience and statistics from previous similar events. The MAP should be event- or venue-specific and may be influenced by local or state guidelines or regulations. Every medical action plan should address the following components:

- a. Physician medical oversight;
- b. Level of care to be offered;
- c. Human resources;
- d. Specialized medical equipment;
- e. Treatment facilities;
- f. Transportation resources;
- g. Emergency medical operations;
- h. Communications;
- i. Command and control;
- j. Documentation; and
- k. Continuous quality improvement.

Level of care

A plan for the level of medical care to be provided should exist prior to every motorsports event. Although ALS capability is always preferred at any motorsports event, some communities may not have such resources. Therefore, the level of care at a motorsports event should be consistent with community standards.

Although not frequently needed, in many EMS systems physicians can provide an expanded scope of practice (such as a surgical cricothyrotomy, rapid sequence intubation and/or an



PHOTO JEFF T. GRANGE, MD

The Baja 1,000 pits man and machine against the environment for approximately 1,000 miles through the deserts of Mexico.

amputation) that has been shown to save drivers' lives.⁷

Smaller venues and/or promoters may not be able to afford qualified physician coverage; however, most large venues and sanctioning bodies now require a physician with emergency medicine and prehospital expertise to be on-site during on track activity. All medical personnel should be oriented to the racetrack and educated about the standard track operating procedures prior to the event.

Human resource plan

A basic human resource plan that addresses roles and responsibilities for medical personnel and logistical issues

surrounding their deployment should be developed. This plan should address the number of EMS personnel necessary to deliver appropriate care for the expected numbers of drivers at the particular race. Although it's impossible to predict the number of patients you'll treat at any motorsports event, good medical reconnaissance and experience should provide you with an acceptable estimate.

In motorsports, it's not unusual to have multiple vehicles crash simultaneously. The number of medical personnel available should be adequate to care for the worst historical crashes in a particular type of racing. All medical personnel must also be appropriately

Physician medical oversight

A locally licensed physician medical director should be appointed to oversee medical care at every large motorsports event. This physician should actively participate in the design and implementation of the event's MAP. Both indirect (protocols) and direct (on-site) medical oversight are important. Medical literature demonstrates that on-site physicians can positively impact decision-making in the field, especially regarding nontransports and triage decisions.³⁻⁶ *Example:* A paramedic examines a stock car driver who's having chest pain, but the patient has an opportunity to "make it to the big time" if he performs well in a particular race. The patient adamantly refuses to go to the emergency department (ED) until the race is over. The on-site physician talks to the patient, however, and the driver agrees to be transported to the hospital for evaluation. Although the paramedic may have said the same thing, the physician's presence can often sway a patient's decision.

A traveling medical director and safety team can also be an asset to the planning process. These individuals not only have the advantage of experience with the specific race cars and extrication experience, but also have personal knowledge of driver injury history and quirks, such as not liking anyone to touch them while they get out of their car. Some traveling teams hold practice extrication sessions to familiarize local emergency teams with their unique form of racing.



PHOTO: JEFF T. GRANGE, MD

Professional road racing motorcyclists have “aerodynamic humps” that interfere with spinal immobilization. Cut away these humps before placing the driver on a backboard.

certified/licensed/accredited to practice their medical specialty in the jurisdiction in which the motorsports event is being held.

Medical equipment plan

A basic medical equipment plan addressing the highest anticipated level of care should be in place and should describe the medical supplies and equipment to be carried in mobile medical units and have available at fixed treatment facilities. As always, the ABCs should be addressed first and foremost. Therefore, supplies and equipment, such as defibrillators, endotracheal tubes, Laryngeal Mask Airways (LMAs), CombiTubes, percutaneous cricothyrotomy kits, bag-valve masks, cervical collars, backboards, airway confirmation equipment and safety gear, are critical to have on hand.

Non-medical equipment, such as blankets, sunscreen, ear plugs, radios with noise canceling headsets, extrication equipment, helmet visor removal tools, fire suits, fire suppression vehicles, ambulances and specialized emergency response vehicles, should also be considered in this part of the plan.

On-site medical treatment facilities

On-site medical treatment facilities are usually present only at large motorsports venues or races that last for an extended time period or have long transport times to definitive care.

Facilities may range from a tent to a freestanding ED.

The exact facilities will depend on the specific event, human resources and financial resources. It’s important to remember that on-site facilities shouldn’t delay transport of critically injured or ill patients to definitive care.

Example: Although a state-of-the-art medical facility may exist at some speedways, a seriously injured race car driver with multi-system trauma should probably bypass any care centers and be transported to the closest appropriate trauma center as soon as possible. If an airway cannot be established on the racetrack or in the ambulance, however, then the driver might benefit from being brought into a care center for airway stabilization prior to transport to more definitive care.

The capabilities of on-site medical facilities should be clear to all medical staff, so every medical team member can decide whether to send a patient to an appropriate on-site facility or start transportation to the hospital. The capabilities of all potential off-site facilities (adult and pediatric trauma centers, burn centers, re-implant services, cardi thoracic surgery, decontamination facilities, etc.) should also be clear to all medical staff, so each patient can be transported to an appropriate hospital.

Transportation plan

A plan for deploying emergency and nonemergency transportation resources should be in place prior to any large event. Transportation resources may include ground ambulances, air ambulances, boats, motorcycles, bike teams, all-terrain vehicles and other specialized emergency response vehicles.

Although theories abound on how best to utilize emergency transportation resources, every motorsports event is different and requires careful planning. Consider the following:

1. Minimization of response times;
2. Safety of caregivers;
3. Minimization of vehicle transport through congested areas;

4. Designated parking;
5. Helicopter landing zones; and
6. Designated restricted emergency access routes.

Whenever helicopters may be used to transport patients, a dedicated landing zone must be established and secured prior to the start of the event. Whenever possible, a plan should be in place to distribute patients from the motorsports event to various hospitals to prevent overloading any one facility.

Emergency operations plan

A basic emergency operations plan, addressing elements of responsibility for fire suppression, rescue/extrication and medical care, scope of medical care, anticipated duration of operations, geographic limits of medical operations, and medical team roles, should also be in place. The plan should address:

1. The relationship with other functional components, such as security/law enforcement, venue administration and public relations;
2. Special plans for VIPs and famous drivers when they crash;
3. Plans for what will occur in the unfortunate instance of an on-track death; and
4. Procedures for dealing with multiple casualty incidents and other disasters.

All medical personnel and key administrative personnel should be aware of the standard operating procedures regarding disaster operations. Medical personnel should also be assigned multiple casualty incident roles in accordance with an accepted incident management system prior to the beginning of the event.

Communications

Efficient communication is key to the successful delivery of EMS during a motorsports event. The communications system must be determined and tested prior to any event. Options might include voice amplification, hand signals, colored flags, lights, ra-

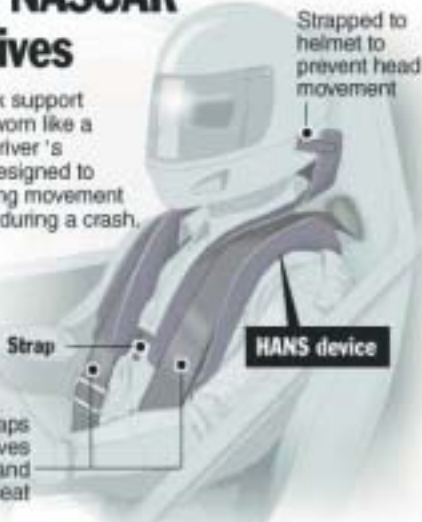
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Head restraint can save NASCAR drivers' lives

The head and neck support (HANS) device is worn like a harness over the driver's shoulders and is designed to prevent the whipping movement of a driver's head during a crash.

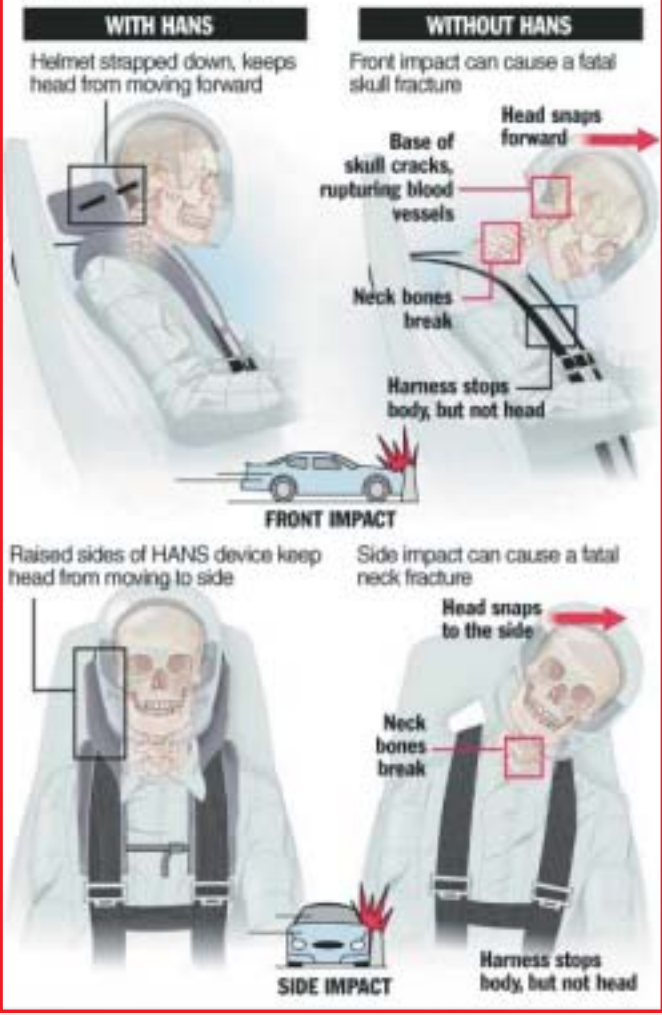
Made of: Carbon fiber and Kevlar, the synthetic material used in bulletproof vests.

Harness straps run through grooves holding driver and device to seat



How the HANS reduces driver injuries

When a speeding car hits a concrete wall, the sudden stop exerts more than 100 times the force of gravity. A standard racing harness stops the driver's body, but the head continues forward, putting deadly stress on the neck and skull.



The HANS (Head & Neck Support)

The HANS device is designed to safely restrain the head of a driver in the event of a significant impact. A properly fitting HANS device allows the driver's head 45° of rotation left and right. Vertical head tilt is nearly identical to that of an unsupported driver. The sole connection of the HANS to the driver is via a spring-loaded connector button on each side of the helmet. The base of the device is held in place by the driver's regular seatbelt straps. There are no entangling, confining straps on the body to catch on parts of a car chassis.

Because of the diversity of cockpits, head and neck restraints, and medical care preferences, there must be diversity in management of injured racers wearing head and neck restraints. All driver restraint equipment (like the harness, window nets, seat, and head and neck restraint) makes egress more difficult. Extraction of a racer with a HANS can be accomplished in several ways:

1. The head can be stabilized and the helmet removed essentially as it is without the HANS once the HANS tethers have been cut or detached. Because the HANS is open to the front, the airway is accessible.
2. In cars where there is sufficient space above and behind the driver, the HANS can be removed by sliding it upward and rearward, past the neck. The HANS can also be rotated around the neck and off to one side for removal.
3. The driver can also be extricated with the HANS still connected to the helmet.

To remove a HANS

1. Stabilize the head according to standard racing crash response procedure of reaching into the helmet from the front and bottom of the helmet and supporting the face and skull with your fingers and hands.
2. Release or cut the shoulder belts.
3. Release or cut the tether connecting the HANS collar to the helmet.
4. Remove the helmet.
5. Remove cockpit head supports.
6. If there's sufficient space above and behind the injured racer's head and shoulders, remove the HANS by sliding it back and up past the racer's neck while continuing to stabilize the racer's head.
7. If there isn't sufficient space above and behind the racer's head, rotate the HANS to the side and remove it by sliding it to the side, past the racer's neck.

If there isn't sufficient space to remove the HANS, extricate the racer from the cockpit with the HANS in place and continue to stabilize the driver's head.

PHOTOS & ILLUSTRATION HUBBARD/DOWNING INC.

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dios, cellular phones or satellites.

A dedicated on-track channel and a back-up system should be in place. Ideally, a centralized “race control” should dispatch all on-track resources to maximize the safety of all medical, fire and other safety personnel, and drivers.

All personnel should be trained in radio operation and etiquette to maximize efficiency and minimize confusion. Most motorsports events will also require headsets due to high noise levels.

Command & control

Every motorsports event should have a clear organizational structure that delineates responsibility and authority for the provision of medical services. The integration of medical oversight into the overall administrative structure of the event is essential. Most experts recommend using the Incident Command System for scene management and recommend utilizing the most medically qualified health-care personnel to provide patient care.

Standardized documentation

Standardized documentation of medical care is important for several reasons. The documentation serves not only as a medical record, but also as a legal, risk management, continuous quality improvement and research tool. Because all patient contacts should be documented uniformly, a patient contact should be defined. *Example:* If 10 cars crash but eight drive cars away and keep racing, are the eight drivers patients? A policy re-

garding who is required to seek medical care and clearance is helpful in the racetrack environment.

Due to vested financial and emotional interests, EMS personnel tend to treat an increased number of drivers and crew members who refuse further recommended medical treatment. Therefore, a procedure must be in place to deal with refusal of medical care both when a patient is competent to refuse care (usually an “Against Medical Advice” form) and when a patient isn’t competent due to altered mental status or possible head injury (see “Who Gets to Ride?” p. 46). Many organizations now require medical personnel to evaluate any driver who crashes a vehicle and cannot drive away from the incident. Some venues also mandate that any driver who refuses medical care may not race at their venue until cleared by a qualified physician.

Fire suppression/rescue/extrication

Due to the racing environment, numerous vehicle configurations, various types of fuels and constantly evolving safety technology, specially trained fire/safety personnel and specialized equipment are necessary for optimal support of most motorsports events. In general, fire/safety personnel are responsible for fire suppression, driver extrication, oil and fuel spill control and track surface cleanup. Track medical personnel, on the other hand, are typically responsible for all driver/patient care.

Although both teams have specific duties, everyone must understand the others’ roles and responsibilities to most efficiently provide appropriate, timely care to drivers. Coordinated training on an actual race vehicle under simulated race conditions prior to an event is instrumental in the success of any motorsports fire/safety and medical team.

Although most large venues have specialized fire/safety and medical teams, many smaller venues and organizations may have a single crew who’s responsible for all aspects of fire suppression, rescue, extrication, med-

ical care and track cleanup. Certain race vehicles, such as motorcycles, however, are unlikely to require significant fire or extrication resources.

Historically, burns have killed more drivers than anything else. Although fuel cells and other technology have significantly reduced the number of drivers getting burned, burns still pose significant risks to drivers and rescue workers (see photos, p. 110). Always be aware of the potential for fuel spills in the pits, at the crash scene and elsewhere. Many experts recommend that all EMS personnel be in full fire suits when working near vehicles, such as Indy Cars, that utilize methanol because it burns invisibly. Due to this characteristic, it’s also important to realize that a driver who jumps out of an open wheel race car and starts dancing, rolling on the ground or “acting crazy” for no apparent reason is probably on fire, even though you can’t see the flames.

Driver/patient care

Although all EMS involves scene safety and the ABCs, providing medical care during a motorsports event differs significantly from providing medical care on the street. Consider scene safety. Standard practice during many motorsports events is to dispatch fire and medical personnel while vehicles are still racing or at significant speed—often only several feet away from rescue personnel. Sometimes, this is done to facilitate a rapid response to the driver, but it may be due to the inability to stop a race once it is under way, the time pressures of a live television broadcast or the desire to keep cars moving around a track via a pace car.

An example of a race that probably can’t be stopped once it starts is the Baja 1,000, which pits man and machine against the environment for approximately 1,000 miles through the deserts of Mexico with sometimes only BLS available every 100 miles or so (see photo, p. 96).

The safety of rescue workers, however, must remain the No. 1 priority. In general, motorsports EMS professionals should:

Following a crash, racer Josh Hayes lands with his motorcycle on top of his bent leg and knee.



PHOTO COURTESY CALIFORNIA SPEEDWAY

Common hand signals used in motorsports



▲ Bring a cervical collar.



▲ Bring the airway bag.



▲ Bring the monitor/defibrillator.



▲ Horizontal hand movement with the hands starting together (pictured left) and then moving apart (pictured right) two times indicates the need for a backboard.



1. Never turn their back on race traffic; they should use their vehicles to help protect the scene;
2. Not park directly below crash scenes on banked tracks due to fuel runoff and fire risk;
3. Understand the sanctioning body's policies for crash responses and cautions; and
4. Stop the event if necessary for the safety of the patient, caregivers or others.

Triage

Triage of motorsports patients is also quite different from the typical EMS call. There is almost never just one car that crashes during most races. Therefore, triage starts even before your arrival at the first crashed vehicle. *Example:* To indicate that they're OK, drivers in open cockpit cars remove their steering wheels and stock car drivers are instructed to put their window nets down after a crash (see photo, p. 94). Although the net is sometimes knocked down by the impact, if the net is still up, responding medical personnel will generally stop and check those drivers first.

During boat races, on the other hand, rescue boats respond to any boat that's upside down before those that are upright because the drivers have only limited oxygen supply. After overturning, race boat drivers are often disoriented due to the influx of water, sudden darkness or head injuries and can't self extricate via the escape hatches on the bottom of their boats.

Some motorsports emergency response vehicles are equipped with on-board television monitors that enable emergency personnel to view the crashes in real time to assess mechanism of injury and assist with triage.

Technology is now available that flashes a light on the side pods of Indy Cars following impacts greater than predetermined criteria (e.g., 50 g). This allows medical personnel to respond to the vehicles with the highest risk

for injured drivers first.

While checking for injured drivers, on-track rescue workers should also look for any debris in the grandstands or spectator areas that may require dispatching of other resources.

C-spine & airway management

Cervical spine management is also different in motorsports. Although the fundamental principles remain unchanged, medical personnel at races can witness a crash and start evaluation and treatment literally seconds following an incident. Because it takes time for the area around broken bones to bleed and swell and for the adrenaline from a crash to subside, drivers may not experience pain immediately following a fracture-producing impact.

Numerous drivers have presented for evaluation and denied having any pain even though they had gross deformities to their extremities. Drivers often don't start having pain until 10–20 minutes following a crash. Because of this, the trend of clearing C-spines clinically in the field should be discouraged until a driver has been observed for at least 10 minutes following a significant impact.

Judgment must be used with drivers who adamantly insist on getting out of their race cars following a significant impact. Confused drivers may not immediately feel the pain of a broken neck; however, forcefully restraining a driver could potentially do more harm than good.

Cervical spine management at racing venues has also become more complicated due to the increasing use of various head and neck restraint devices (see photos and sidebar, p. 102). The most appropriate way to extricate and immobilize drivers with these devices is somewhat controversial and requires further research.

In general, it's difficult to obtain an advanced airway while a driver is still in their vehicle (see photo, p. 100). Most experts now recommend the initiation of basic airway adjuncts (oral airway, bag-valve-mask ventilation, etc.) while the



◀ Everything is OK or "Code 4." No further assistance is needed.

PHOTOS COURTESY CALIFORNIA SPEEDWAY



PHOTOS HENRY BOCK, MD

The trumpet airway device (TAD) uses a conventional nasopharyngeal airway fitted with a pediatric endotracheal tube. By inserting a nasal trumpet into the nares through the open helmet shield, the end of the pediatric tube in the trumpet can be inserted to provide ventilation until the helmet can be removed.



driver is still in the car, with immediate extrication in full spinal immobilization from the car prior to obtaining an advanced airway, such as endotracheal intubation.

On occasion, however, a driver may require prolonged extrication and placement of an advanced airway device while still in the race vehicle. Recommended airway techniques for trapped drivers include oral airways, nasal intubations, CombiTubes, LMAs, digital intubations and surgical cricothyrotomies.

Blind techniques such as the CombiTube, digital intubations or LMA may be particularly helpful when a driver is trapped upside down in a car or in a position where direct laryngoscopy is impossible.

The Indy Racing League's rescuers have recently assembled the trumpet airway device (TAD). This device uses a conventional nasopharyngeal airway fitted with a pediatric endotracheal tube. By inserting a nasal trumpet into the nares through the open helmet

shield, the end of the pediatric tube in the trumpet can be inserted to provide ventilation until the helmet can be removed (see photos at left).

Breath sounds can be impossible to hear due to the loud noises inherent to motorsports. Thus, multiple methods to confirm appropriate advanced airway placement should be utilized (e.g., ETCO₂, direct visualization, pulse oximetry, chest rise and fall and esophageal detection devices).

It's also important to remember that carbon monoxide poisoning should be considered in any drivers who have been racing in closed vehicles for a prolonged period of time.

Cardiac assessment

Cardiac function can be assessed as usual, with simple distal extremity pulse checks. In most cases, the establishment of IV lines should wait until the driver is extricated and loaded into an ambulance or other rescue vehicle and en route to a higher level of care. Interestingly, many drivers die

PHOTO COURTESY CALIFORNIA SPEEDWAY



Above: Certain race vehicles, such as motorcycles, are unlikely to require significant fire or extrication resources but can produce more traumatic injuries. **Right:** EMS crews carefully remove an injured rider as others continue to race.



PHOTO JEFF T. GRANGE, MD

from heart attacks while racing and may injure not only themselves, but also other drivers, crew members or spectators.⁸

It's important for emergency personnel to realize that driving two hours on a road course is equivalent to running 15 eight-minute miles.⁹ Many experts, therefore, ban anyone with significant heart problems from competition.

Neurological assessment

The neurological assessment of racers has potential pitfalls. Imagine asking a NASCAR NEXTEL Cup driver what day it is after he crashes. The driver will probably tell you correctly that it is Sunday and that he's at the racetrack. More detailed questions should be asked, however, because drivers know they're usually at the racetrack when they see EMTs and paramedics, and they always race on Sunday.

On the other hand, if a driver correctly tells you that it is April 25 and he's at California Speedway in

MOTORSPORTS EMS |

PHOTO COURTESY CALIFORNIA SPEEDWAY



Top & Right: 27% of those killed at auto races are track workers, spectators and journalists. EMS must have enough personnel available to handle the worst historical crashes.

Fontana and he just crashed in turn 4 after being bumped by Rusty, then he probably isn't confused.

In general, all unconscious drivers and those with altered mental status should be extricated with full spinal precautions. Most driver deaths are due to head and neck injuries and a high index of suspicion should be maintained for such injuries. Transport drivers to a trauma center whenever appropriate.

Although some advocate cutting



PHOTOS JEFF T. GRANGE, MD

Crews should train on actual race cars under simulated race conditions prior to an event to ensure familiarity during actual incidents.

PHOTOS JEFF T. GRANGE, MD



Left: Emergency personnel transfer an injured motorcyclist from an all terrain vehicle to their ambulance.

all clothing off a driver while still in the car so injuries aren't missed, the authors recommend leaving all protective clothes, such as fire suits and gloves, on a driver until they're in an ambulance. This is because of the continued risk of fire as long as the driver is in the race vehicle and to prevent a public spectacle.

Professional road racing motorcyclists have "aerodynamic humps" that interfere with spinal immobilization. These humps should be cut away before the driver is placed on a backboard (see photo, p. 98).

Initial in-car assessment of drivers should include the driver's mental status, ability to move arms and legs, grip strength and questions regarding pain, numbness, paresthesias or stiffness in neck/back.

If there's ever a question of whether or not a patient requires the vehicle to be cut to safely extricate a

Right: Specialty vehicles, such as Kawaskaki mules and quad runners, are invaluable at rough-terrain venues with limited access routes for ambulances.



driver in full spinal immobilization, the authors recommend the old adage, “If in doubt, cut them out!”

Conclusion

Motorsports, a rapidly evolving EMS subspecialty, has many unique aspects that require specialized education, training and practice. To learn more about the latest advances in motorsports science, check out NFPA 610, “Guide for Safety at Motorsports Venues” at www.nfpa.org. Also consider joining the International Council of Motorsports Science. For more information, visit www.motorsportsafety.org. JEMS

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Henry Bock, MD, is an emergency physician at Methodist Hospital and medical director for Indianapolis Motor Speedway and the Indy Racing League. Bock started working at Indianapolis Motor Speedway in the 1960s and has been a pioneer in the evolving subspecialty of Motorsports Medicine ever since.

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