Exclusive: Field amputation difference between life and death

EMS, fire and hospital personnel describe interstate collision, patient entrapment and field amputation to save a man pinned inside his truck cab by 80,000 pounds of logs

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Editor's Note:

After reporting the news of a rare field amputation on a remote stretch of Interstate 90 in north Idaho, we contacted Christopher Way, BA, paramedic, and Chief of the Kootenai County EMS System, with questions about the incident. In this exclusive article, Way, joined by other chief officers, physicians and an operating room nurse, give a detailed report of the incident, their actions to save the life of a trapped truck driver by amputating his right leg, and the lessons they want to share about this once-in-a-career incident. This unique rescue was made possible by a unique relationship among all involved.

By Christopher Way, BA, Paramedic, Edward de Tar, MD, FACS, Steve Isaacson, BA, Paramedic, Carmen Sincerbeaux, RN, BSN, MA, Marcus Torgenson, MD, FACS, David Wineinger, MD

Paramedics and firefighters called a trauma surgical team to a cold, slippery mountain pass on the morning of January 19, 2017 to amputate the leg of driver trapped in the sleeper-cab of his truck. The lifesaving field amputation was a first for all involved, a rarity in prehospital care in the United States and has received intense interest from other rescuers.

Our intent is to share exclusive details about the incident, how years of planning for and collaboration on other incidents led to this success and what other providers from

hospital-based trauma teams to fire and rescue professionals to EMS providers can learn from this incident.

FIRST RESPONSE AND SIZE-UP


A field amputation was necessary to remove the drive of a semi after a collision with a log hauler on a remote stretch of I-90 in north Idaho. (All photos courtesy of Kootenai Fire and Rescue)

Units from Shoshone County (Idaho) Fire District #2, under the command of Chief Mark Aamodt, responded to a multi-vehicle accident with injuries involving several semi-trucks. Upon arrival, the responders realized the significance of their situation.

The incident happened just east of the 4th of July Pass in the west bound lanes of Interstate 90 near the Rose Lake interchange and on the Shoshone/Kootenai County line. There were multiple vehicles, mostly semi-tractor trailers, involved and the incident stretched over half a mile of the interstate.

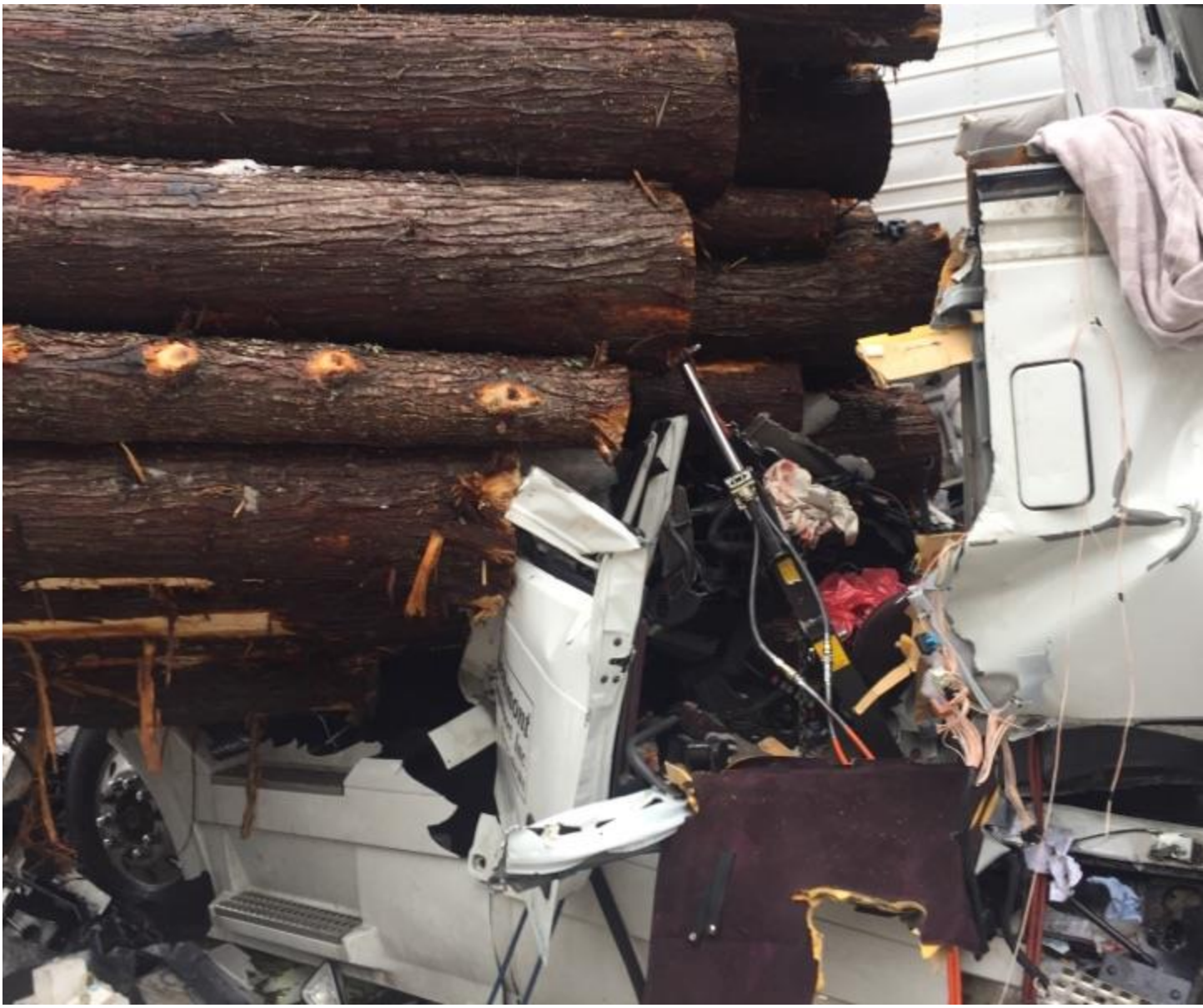
Even with multiple vehicles, there were only two patients that required care and transport. One critically injured patient was immediately removed from the scene and transported by ground ambulance to Shoshone County Medical Center in Kellogg, Idaho — about 17 miles to the east.

At the time of the initial patient transport, there was no way to drive west toward the trauma center in Coeur d'Alene, Idaho because of the accident blocking the east bound

lanes of the interstate. Additionally, air transport was not an option because of the freezing fog and ice that were persistent throughout the incident.

DIFFICULT EXTRICATION OF TRAPPED DRIVER

The focus of rescuers became extricating the driver who was trapped in the sleeper cab of his semi-truck. The accident is still under investigation; it is still unclear what caused the patient's rig to hit the back of a log truck carrying between 80,000 and 100,000 pounds of logs, but the impact forced the load of logs through the front cab of the truck, pushing the patient still in the driver's seat to the back wall of the sleeper cab. Both of his legs were trapped under the dash board and weight of the logs that were resting on top.

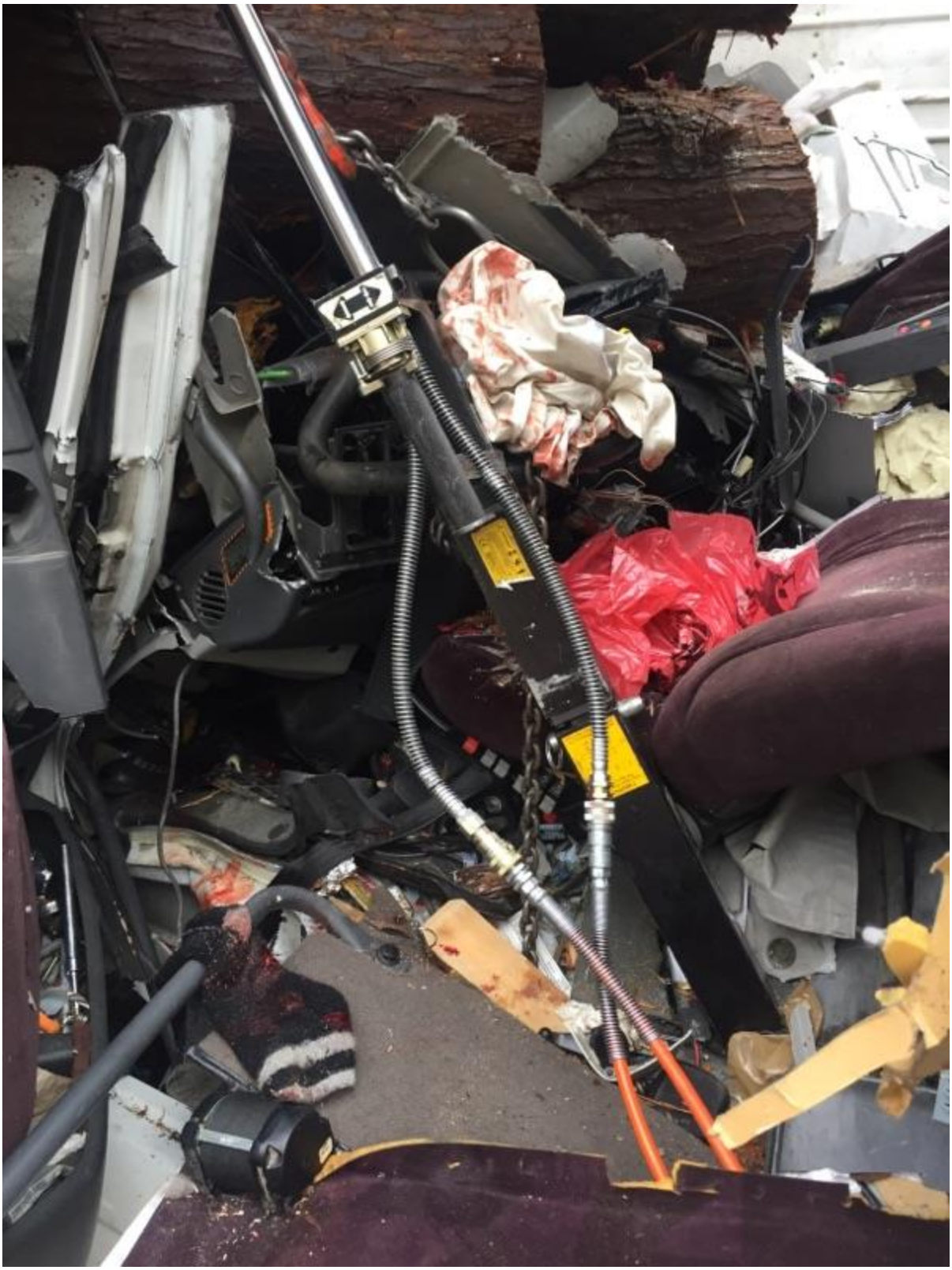


Realizing the significance of the incident and the need for additional resources, Aamodt called for a heavy rescue R121 unit from Kootenai County Fire and Rescue. The three-person crew, consisting of a Lieutenant, an Engineer/Paramedic and a Firefighter/Paramedic, responded to the scene. Additionally, the KCFR Duty Chief, Division Chief Steve Isaacson, responded to the incident. This was an approximately 40-mile response on icy roads. Thus, taking time to get these resources on scene.

Upon arrival, the R121 crew began to assess the wreckage and prepare equipment for what would become a very difficult extrication. Shoring had already been placed on the semi with the patient and the load of logs however; additional shoring was put in place

to further secure the patient's vehicle and the log hauler. The crew also established IV access and provided pain management to the patient during the extrication.

Upon Chief Isaacson’s arrival, he conferred with command and then the R121 crew and got a situation update. It had taken a full two hours to free the patient's left leg from its entrapment. After trying different techniques and equipment, rescuers determined that there was no safe way to fully remove the patient from the wreckage. The patient and first responders were all at significant risk by attempting further maneuvers to move the load (logs) on the semi or to attempt to manipulate the patient's position.



FIELD AMPUTATION DECISION

After working for almost three hours since the initial call and significant discussion, the difficult decision that a field amputation was the only way that this patient was going to be safely (for the patient and rescuers) extricated was made. Isaacson was placed in charge of arranging the appropriate response.

Because the scene was on the east side of the 4th of July mountain pass, there was no cellular service and he had to move about a mile and a half to be able to make phone calls to the hospital. He first contacted the Kootenai Health emergency department in Coure d'Alene. Isaacson spoke to one of the emergency physicians. They discussed the situation and agreed that an emergent field amputation was the only option available at that point.

The emergency physician contacted Marcus Torgenson, MD, FACS, the on-call trauma surgeon. Kootenai Health is a Level II trauma center about 30 miles west of the scene. As a designated trauma center, there is always an on-call surgical team available. On the morning of the incident, the operating room was completely open and a full complement of physicians and staff were available.

Isaacson also requested a scene response from Bill Keeley, Division Chief Kootenai County EMS System. Keeley responded to the scene with extra equipment. Chief Chris Way, KCEMSS, responded to Kootenai Health to gather the surgical team and supplies needed at the scene.

FIELD SURGICAL TEAM

Torgenson, the team leader, was joined by trauma surgeon Edward deTar, MD, FACS, anesthesiologist David Wineinger, MD, and Operating Room Nurse Manager Carmen Sincerbeaux. It was important that the rest of the OR continue to function as normal, the trauma center remain open with another trauma surgeon assuming call duties for Torgenson, and that the hospital remain ready for the truck driver, a priority 1 trauma patient who was clearly going to need further surgery.

In additional to the OR personnel, surgical equipment and O-negative blood was gathered for transport to the scene. Prior to leaving the hospital, it was communicated to Isaacson that although the patient was not actively bleeding, two tourniquets should be placed on the patient's trapped leg to facilitate the ensuing surgical procedure. Time

from the initial call to the emergency department until the surgical team was leaving the trauma center, en route to the scene, was 34 minutes.

During the trip to the scene, Torgenson made some crucial decisions about the procedures he would use and discussed his thought process with de Tar. He discussed sedation and intubation options with Wineinger and made sure that Sincerbeaux had the equipment needed to utilize the techniques he wanted. It was also discussed that a quick decision on whether to transport to the emergency department or go directly to the OR with the patient was needed to ensure appropriate resources were available and ready.

PRE-AMPUTATION SAFETY BRIEFING

Upon arrival at the incident, a very quick safety briefing was given to the hospital personnel. Fortunately, all of the KCFR and KCEMSS Chief Officers have both structural and wildland firefighting gear and the physicians who would be working on the patient were loaned PPE. Torgenson and Wineinger entered the sleeper cab, quickly assessed the patient and determined that due to the patient’s position and inability to access his head that conscious sedation would be used for the surgical procedure.

FIELD AMPUTATION PROCEDURE

Wineinger established an additional IV to administer ketamine and propofol to achieve sedation. Torgenson and de Tar prepped the patient for the procedure.

To access the patient's right leg, of which only a few inches below the knee were exposed, Torgenson reached the patient from the passenger side of the vehicle, laid on his left side across the wreckage and crawled under the crushed dashboard/steering column/overlying logs. This position gave him direct access to the patient's right knee

joint while deTar provided exposure of the knee joint and lighting from the driver's side of the semi.

An EMS stretcher was placed close by to serve as a table for the surgical tools. One of the photos from the incident shows Sincerbeaux with the surgical tools

Due to the limited patient access and the weight of the load on the patient, it was quickly determined that a through the joint amputation would be done. At this time, an ALS ambulance from Kootenai County, Northern Lakes Fire Medic 51, was positioned to receive and transport the patient. Idaho State Police and Idaho Department of Transportation closed the east bound lanes of I-90 so that the ambulance could be placed close to the scene and have egress from the incident. The ambulance was also warmed and the blood was placed in the IV warming drawer knowing that the patient had been exposed to the elements for a significant amout of time at this point.

The surgical procedure took less than 10 minutes with no unforeseen complications and minimal external blood loss. Post amputation, a little more extrication took place to facilitate patient movement. Once that was completed, the patient was quickly moved to an EMS stretcher and placed in the pre-positioned, warm ambulance.

TRANSPORT TO THE EMERGENCY DEPARTMENT

Wineinger and the ambulance crew successfully intubated the patient while Torgenson and Sincerbeaux dressed and covered the wound to prepare for transport. O-negative blood was given and the tourniquets were left in place during transport. The care team also determined that because of the patient's potential for other injuries and hypothermia that it was more appropriate to evaluate him in the trauma room in the emergency department rather than go directly to the operating room.

Torgenson and Wineinger, along with the M51 paramedic, transported the patient. Way transported the other surgical team members back to the hospital so they could assist in continuing patient care and surgery.

INCREDIBLE RELATIONSHIPS LEAD TO INCREDIBLE SUCCESS

From the time of surgical team arrival on scene until the patient was being transported to the trauma center was less than 40 minutes. For the personnel on scene, it didn't seem that long. The entire trip to and from Kootenai Health took no longer than 100 minutes.

Part of the reason for the relatively short response, scene and transport time — this happened on a very remote stretch of north Idaho interstate — and the overall success of this incident was the incredible relationship all of the responders share with each other. While this was the first time they had done something of this magnitude together, they are fortunate to work in a collaborative environment where other efforts had prepared them to know and respect each other.

COLLABORATIVE PLANNING, TRAINING, COMMUNICATION AND RESPONSE

This wasn't the first time that week that many of the same people had worked together on a multi-victim trauma incident.

EMS is a regular and contributing member of Kootenai Health's trauma committee. The physicians — surgeons, ER and anesthesia — are also all members of that committee and met the day before the incident for a trauma meeting. The hospital is supportive

and encouraging of these relationships and the communication it takes to maintain them. Again, a significant part of the successful outcome for this patient can be attributed to the importance placed on relationships, collaboration, communication and the teamwork that were displayed in this incident.

6 LESSONS LEARNED

There were many lessons learned that are equally important to share.

1. PRE-PLAN

Pre-plan for as many different types of incidents as you can. In this case, the surgical procedure itself didn't need discussion, but advance planning for a field amputation — who and what equipment from the OR to take to a scene — could have saved a few minutes.

2. ACTIVATE ADDITIONAL RESOURCES EARLY

Although a difficult decision, sometimes calling for additional resources from fire, EMS and the hospital early will save time.

3. EXTRA PPE

The surgical team was fortunate to have a small amount of extra PPE, but that could have easily not been the case and difficult decisions would have to be made about the level of protection available/provided.

4. HOT WASH

Conduct a quick and informal hot wash because of the number of agencies/personnel involved. If possible, include the hospital personnel in the hot wash.

5. ONGOING MONITORING, ASSISTANCE

Agencies need to implement some form of monitoring responders. This was a high-acuity low-(almost never)-frequency call and ensuring the health of the responders, including hospital staff, is paramount.

6. COMMUNICATIONS PRACTICE, LIMITATIONS

Finally, practice communications. In this case, there was no cellular phone service without leaving the scene which made communication with the hospital difficult. The 700 MHz digital radio system worked very well to talk to the emergency department, but the on-scene personnel were not able to talk to the surgical team physicians directly until Way arrived at the hospital.

The patient is expected to make a full recovery after an additional surgery and rehabilitation. The fire and EMS crews did a remarkable job of securing the scene and making the very difficult determination that a surgical field amputation was needed. The physicians and nurse were put in an unusual situation with lots of people in an unfamiliar environment and performed flawlessly. This was all possible because of the emphasis placed on relationships and inclusion of EMS in the local health care system.

About the authors

Chief Christopher Way, BA, has been in EMS for 25 years and is a paramedic. He has been the Chief of KCEMSS for just over three years.

Edward de Tar, MD, FACS, has been at Kootenai Health as a general/trauma surgeon for over 10 years. Previously he was as a physician in the U.S. Army serving two tours in the Middle East.

Chief Steve Isaacson, BA, paramedic, has been in EMS for almost 40 years and has been the EMS Division Chief at KCFR for almost two years.

Carmen Sincerbeaux, RN, BSN, MA, has been at Kootenai Health for over 10 years and is the OR Nurse Manager.

Marcus Torgenson, MD, FACS, has been at Kootenai Health for seven years as general/trauma surgeon. He graduated medical school from the Washington University in St. Louis and completed his surgical residency at the University of Utah.

David Wineinger, MD, has been at Kootenai health since the early 2000’s and graduated medical school and residency at the University of Kansas.