"He's just mangled" - where do you start?

In the flickering light of a flare drifting to earth, Army flight medic Daniel "Buzz" Buzard spots a scrum of U.S. soldiers bearing a wounded comrade across a stony Afghan riverbed en route to his helicopter.

Only night-vision goggles illuminate on this moonless night, and a glimpse of the casualty leaves Buzard cold.

"He's just mangled," the medic recalls.

He's looking at Army Staff Sgt. Christopher Walker, 28, a bomb technician with a 7-year-old daughter named Kali waiting back home.

"He's missing his left arm, his right arm. His left leg is just all chewed up, and there's blood all over his face," Buzard says. "I'm looking at this going: 'Where do you start?'

This is as bad as it gets, doctors and nurses working in Afghanistan say.

It is a cost of fighting in Afghanistan that continues even as the war winds down. Combat tactics in a land of agrarian vastness dictate that U.S. troops patrol on foot -- rather than in heavily armored vehicles, as often occurred in Iraq -- and risk stepping on the buried explosives that litter the countryside.

The result: More than half of the nearly 460 Americans who lost multiple limbs to combat in Iraq and Afghanistan since 2001 suffered those wounds here in Afghanistan in just the past two and a half years. From 2001 through 2009, seven troops had triple amputations in combat and one lost all four limbs; all occurred in Iraq. Since 2010, after President Obama ordered a surge in combat against the Taliban, there have been 36 triple amputees and four quadruple amputees, all in Afghanistan, Army data show.

The wave of blast-devastated casualties has left military medicine grasping for better ways to treat what doctors say are the worst casualties they have seen in 11 long years of fighting two wars. Even as U.S. forces draw down in Afghanistan, the military is ramping up medical resources to counter this wrenching pattern of wounds in the waning months of this war.

It has led to multiplying by nearly a factor of six -- from 12 to 70 -- the number of medevac helicopters operating in Afghanistan, instituting six months of advanced-care training for hundreds of flight medics, performing dozens of blood transfusions on these wounded even as they are lifted off the battlefield and placing more highly trained medical personnel on medevac flights.

The result: Even as the casualties have grown more severe, the mortality rate for the wounded remains about 9%. In all, 2,143 troops have died in Afghanistan, including those killed in combat, and 17,939 were wounded. In Iraq, 4,488 died and 33,220 were wounded.
Army Staff Sgt. Christopher Walker, 28, a bomb technician, was wounded by an IED in Afghanistan. He lost both arms and his left leg.
The physical destruction when a servicemember steps on an IED is immense, doctors say: shattered bones and flesh, sexual organs and rectums torn or ripped away, eardrums ruptured, limbs to the shoulder or pelvis cut away, infectious bacteria and fungus propelled deep into body tissues.

"Right off the bat, you've got the sickest patient you could ever create," says Army Maj. Eric Heinberg, a general surgeon assigned to a field hospital in Afghanistan's southeastern Khost province. "They're disfigured beyond comprehension."

Troops suffering damaged or destroyed sexual organs from these blasts more than doubled from 71 in 2009 to 190 in 2011, military data show.

Last year, the military gave this new wound a label: dismounted complex blast injury.

Emotionally wrought health workers who can no longer bear the sight and suffering of these patients change jobs.

"It's hard," says Army Col. Martin "Fred" Baechler, a hand surgeon who last year sought re-assignment from Walter Reed National Military Medical Center in Bethesda, Md. "What strikes me is how many times I've heard a wounded warrior say, Just put me back together. I want to be normal."

"These wounds are the worst of the worst," says Army Lt. Col. Brett Freedman, a surgeon working at the Army's Landstuhl Regional Medical Center in Germany. Casualties pass through Landstuhl on their way back to the United States.

The story behind what happened to Staff Sgt. Walker, and the challenge of saving him and others ravaged by these IEDs, was put together from more than two dozen interviews conducted in Afghanistan, Germany and Washington, D.C., with medics on the ground, other doctors, soldiers and Walker himself.

1 blast, 7 tourniquets

On the night of April 24, about 15 minutes before Walker is to be hoisted aboard a medevac helicopter, he is down on one knee working under a heavily armored vehicle disabled by a roadside bomb when a second buried explosive detonates nearby.

He is thrown 50 feet, launched over a tree line to a point where soldiers scramble in the darkness to find him.

Army medic Devon Jackson, 22, sitting in a vehicle further back in the stalled convoy, hears the boom and a call that a "dismount" is hurt. He grabs a medical bag and races through the blackness, directed by others to Walker's side.

"I don't remember how many tourniquets I was putting on where," Jackson says later, describing
his feverish efforts to save Walker, who was being restrained by other soldiers and pleading for anything to relieve the pain. "I just remember I was putting on tourniquets."

Doctors would later count seven tourniquets on Walker, three thigh high and tight around his shattered left leg and two at the shoulder of each ruined arm. They kept him alive, Buzard says.

The Combat Application Tourniquet developed midway through the war -- a simple strap that closes with Velcro, with a plastic windlass for tightening -- is now required equipment for all U.S. troops.

Walker -- who remembers nothing about this today -- is still struggling as the Black Hawk lifts off. Swinging what's left of his right arm, where there is a spear of exposed, charred bone below the elbow, he's effectively stabbing at flight medic Buzard and crew chief Terry Mills, who is trying to give him oxygen.

Soldiers locate Walker's severed right hand, but doctors determine it cannot be salvaged.

The helicopter, flown by a joint Mississippi-Texas National Guard medevac unit known as "Valkyrie Dustoff," is only about three minutes from a small Army field hospital at Forward Operating Base Salerno.

Under the blue light of the aircraft cabin, Buzard, 36 -- a critical-care paramedic in his civilian life -- checks tourniquets, feels Walker's cool skin and reads his body's paleness as proof of lethal blood loss.

Mills, 51, a retired fire chief from Brandon, Miss., pulls up his goggles so Walker can look into eyes, and leans in close to be heard over the roar of the engine.

"Calm down, brother," he says. "We're getting you taken care of. We're not trying to hurt you. Hang in there with us. We're going to get you to the hospital."

100 minutes down to 40

The most common way soldiers die from these massive wounds is simply to bleed to death.

Despite all of the tourniquets that kept him alive, Walker needs blood when he arrives at the field hospital. A loud-speaker emergency call for his A-negative blood type goes out across the Salerno base, and soldiers quickly respond. During hours on the operating table, he will receive seven gallons of it, six times his body's blood volume.

Recent Army research found that more than a thousand U.S. troops killed in battle in Iraq and Afghanistan from 2001 to 2011 could have been saved with quicker and more advanced care, and that 90% died from blood loss.

"Really, most of the patients are dying before they get to the hospital," says Air Force Col. Stacy Shackelford, director of trauma care in Afghanistan.
That reality, in a land of mountainous terrain and vast distances, is driving a raft of medical initiatives.

Tripling the number of medevac helicopters in recent years has cut the average response time from 100 minutes in 2009 to 40 today.

This year, some medevac crews began carrying refrigerated blood products to immediately begin transfusions for casualties picked up off the battlefield. Fifty blood transfusions have been done so far this year, according to military data. And doctors are studying the option of using freeze-dried blood.

Researchers recorded a 66% higher survival rate for casualties handled by National Guard crews such as the Valkyrie Dustoff platoon -- where flight medics are trained to higher standards as paramedics in their private lives. That finding has prompted the Army to require that hundreds of its flight medics receive the same advanced, six-month training. The first graduating class was in October.

Meanwhile, an Air Force doctor and two anesthesiologist nurses flew on medevac missions this year to provide advanced care. A second group will deploy in the months ahead. And the Army is placing critical-care nurses on medevac flights.

"That's really what it's all about," says Army Col. Bruce McVeigh, a medical task force leader in Afghanistan. "It's moving our assets forward to help get to that point where we can sustain life even better."

'You did a great job'

Walker is still struggling to break through restraints when he's wheeled into the emergency room at Salerno between 8 and 8:30 on the night of the explosion.

With his left cheek crushed, head bleeding and a bird-shot pattern of dirt and sand blasted across his torn body, he's trying furiously to wipe the blood from his eyes and face -- except that he has no hands.

Army Lt. Col. Christina "Chris" Cawley is the orthopedic surgeon on duty and throws herself -- all of 5-foot-7 and 125 pounds -- onto Walker, holding down his flailing limbs long enough for assistants to run sedatives into his system.

With blood everywhere "it was like trying to wrestle with a greased pig," she recalls.

It feels like the clock is ticking on Walker's life. "It's terrifying," says Army Capt. Chuck Biggs, a nurse working with Cawley. "You can do all the right things, but take too long doing them, and people will die."

The small hospital would be the first stop on a long trip home. Over several days, Walker would
transfer on flights staffed by critical-care Air Force medical teams to larger, better-equipped facilities -- first to an Air Force hospital at the Bagram Air Base north of Kabul, then after a seven-hour flight to the Army facility in Landstuhl and finally nine hours later by air to Walter Reed.

Here at Salerno, Biggs says, the key is damage control and preparing the patient for transfer within 10 to 12 hours -- by plane or helicopter -- to the next stop at Bagram. His shattered left leg is taken off at the hip and his left arm is removed above the elbow. The exposed bones in his right arm below the elbow are left for future surgery. Major blood vessels are tied off. And a crew of six doctors, medics and nurses work for three hours at the painstaking, but crucial task of cleaning the gaping wounds.

Dirt and stones that were turned into shrapnel by the blast, as well as anything else laying on the ground -- even green foliage -- is pulled out of his body.

"We've seen 6-, 8-inch-long pieces of grass and weeds blown physically into the human body," Biggs says. "And it's still green. It's still alive. It's amazing to see that and have to deal with pulling weeds out of someone's leg or their abdomen."

Cutting away dead tissue, scrubbing raw surfaces with tiny brushes and rinsing with saline solution pouring from small hoses, is vital to prevent bacteria and fungus -- common in the soil of Afghanistan -- from infecting wounds.

Cawley works to save a long section of skin and flesh from Walker's amputated left leg, leaving it attached to his body. Doctors will use it later, instead of painful skin grafts, to close the left hip.

Months later at Walter Reed, where the veteran combat surgeon has been re-assigned, she meets Walker on a rainy October morning to talk about the day back in April when he arrived at the Salerno hospital. Aware that every salvaged joint is precious to an amputee, Cawley explains the difficult choices she made.

"This (left) arm was attached by skin. But bone destruction was just too big. I wanted to save the elbow. But I couldn't," she says to Walker.

Her eyes fill with tears.

"I never get to see (casualties) afterwards," she says about her war deployments. "They always go away. I don't get to tell them that I'm sorry."

Walker, across from her in an electric wheelchair, tries to console her.

"You did a great job," he says. "Definitely (you) don't have to tell me you're sorry."

'I'm happy I'm alive'
Six months after the bomb went off in Afghanistan, Walker -- who says he was in the best condition of his life when he deployed to Afghanistan last November -- has aspirations far narrower than those of other young combat veterans his age.

There might be college and a career ahead, perhaps even a training assignment in the military. He loves the intricacies and challenges of figuring out explosive devices. His wife, Tiana Straub, is also an Army explosives ordnance technician.

Before figuring out the rest of his life, Walker says he must learn what he can do with the rest of his body.

"It's almost like starting over. Like an infant, you've got to learn to use your (artificial) hands again," Walker says. "I've seen people do amazing things with them, but they've had years and years of practice."

His days are filled with acquiring what his occupational therapist, Caitlin Dennison, calls "the skills of the job of living."

"The normal things you do," he explains. "You wake up in the morning and you go to the bathroom. You hop in the shower. You come out and get dressed. You get yourself ready, grab something to eat and you head out for the day. It's just normal, self-sufficient, everyday life."

"It's pretty much where I'm trying to get back to first," he says, wearing a T-shirt printed with the phrase, "Wounded Warrior (some assembly required.)" "Once I get there, I'll start adding on to it."

He shares a two-bedroom suite with his father, Roger Walker, 57, a commercial truck driver who has stopped working for now to care full-time for his son. His father helps him bathe and dress each day. They live in a complex called Harmony Hall, a building designed for outpatient amputees on the Walter Reed campus.

His daughter, Kali Walker, is a child from his first marriage who lives with her mother in Virginia.

After surgeries to clean and close his three amputated limbs, rebuild torn retina muscles in his eyes, remove shrapnel, restore his face and treat a collapsed lung, Chris Walker is learning to walk on an artificial leg and use computerized prosthetic arms, devices that read his muscle impulses. The other day, he practiced using a knife and fork, slicing putty in a dish, and took driving lessons.

"There's days that are horrible," he says candidly. "It can be just getting a can out of the refrigerator. You've done it a hundred times. But now that day you drop three in a row."

"Some days things go well. Some days things don't. You just got to keep going," he says. "It's complicated. But I'm happy I'm alive. I have a wife. I have a daughter. And I didn't want to die."