Healing the Battle-Scarred Brain
By Keridwen Cornelius

Sergeant Robert Bartlett is learning to live with three layers of scars, each deeper and less visible than the last. There are the flesh-colored grooves and puckers scrawled across half his face; the blotches of dead brain tissue editing his memory; and the war zone images reeling through his thoughts, subtly rewriting his personality.

Because of advancements in weaponry, armor and medicine, Robert is one of thousands of soldiers returning home with a new kind of brain – one scarred not only by blast-induced traumatic brain injury but also by posttraumatic stress disorder. Army surveys estimate that as many as one in five troops returning from Iraq and Afghanistan suffers from TBI, while one in six shows signs of PTSD.

These soldiers face an arduous process of cognitive, physical and psychological therapy, presenting doctors and therapists with a host of challenges. Diagnosis of TBI remains spotty, PTSD is still shadowed in stigma, and little is known about the long-term prognosis of blast survivors. This country is entering a new chapter in brain trauma therapy, and men and women like Robert are writing their own stories of healing.

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From the patriotic bumper stickers on his pickup to the bracelet commemorating his slain commander, Robert Bartlett embodies the military. A sturdy, buzz-cut 34-year-old, he shifts between friendly, firm and fired-up like the Irish pub bartender he used to be. His major life decisions have been based firmly on morality and loyalty. There seem to be no cracks in his convictions, no fissures where doubts could filter in. He seems, in every sense of the word, solid.

The son of a Vietnam veteran, Robert joined the military in 2003 and was deployed to Iraq two years later. He became a scout sniper but says much of his job entailed humanitarian work like handing out supplies to locals and helping build schools and community centers.

Then, on May 3, 2005, Robert and his team were scouting out an area near Baghdad when a bomb exploded into their Humvee.

The blast hit him like a sledgehammer, ripping off his face from his left temple to the right side of his chin, singeing his hands and peppering his head and body with

shrapnel. It decapitated his truck commander, demolished most of his gunner's legs and propelled his other commander out of the truck.

Smoke choked the air, fusing with the stench of burnt flesh, burnt hair and diesel fuel. "All I could hear was a loud ringing in my ears and a faint voice screaming in the background," recalls Robert. "Later I would learn it was my own."

When the gunner tried to stand, his pulverized knees collapsed beneath him, and he crumpled into Robert's lap. The two men lay there holding each other, waiting for death to end the pain.

Then the sound of "metal ripping apart and crinkling, like sand in gears" echoed into the truck. The crushed door flung open to reveal Sergeant Greer, the commander who'd been blasted out of the truck. Greer began driving the mangled Humvee out of the kill zone while Robert moaned, "GO, GO, GO, GO" – all he could manage through his disconnected, dangling jaw.

They advanced as far as they could until they met other troops, who sped them back to Camp Balad. Later, Greer would say he heard the voice of the killed commander, Sergeant Brooks, instructing him every step of the way as they escaped the danger zone.

When they pulled into camp, Robert didn't want "his guys" to worry about him, so he tried to walk into the hospital, but the paramedics swept him onto a stretcher.

Five minutes later he was clinically dead.

This is how Robert describes the experience: It felt "like a warm blanket of love came over you that took every bad thought out of you. No pain, no hurt, no sorrow, no stress. Nothing but pure love." He says he, too, heard Sergeant Brooks whispering to him, telling him he had to go back because he hadn't had a wife and kids yet.

Then pain seared through the bliss as the doctors restored his life.

He was declared dead two more times in the following days – once at Camp Rustamiyah near Sadr City, once again at Walter Reed Army Medical Center. There, he emerged from his drug-induced coma in a fog of fear, his life intact but his lifeline cut. "I felt absolutely afraid because if my guys weren't there, I didn't feel secure. I didn't have my weapon. I was in a strange place and people were

working on me. I didn't trust a single person in the room until I got my family there."

To someone who's never seen combat, it seems inconceivable that a person would be more afraid in an American hospital than in the maelstrom of war. But Robert explains, "You gotta imagine that you're with your guys day in and day out. They know you better than your own family. And they will absolutely die to get to you, whether you're dead or not. And then your guys aren't there, and you've been severely injured and you can't defend yourself. Would you trust anybody in the room?"

Robert remained at Walter Reed for a month while doctors sutured his collapsed lung, staunched his internal bleeding and affixed a new titanium jaw. He returned home to Phoenix, and over the next three years flew back to Walter Reed and Johns Hopkins Hospital to receive nearly 100 procedures. The surgeons inserted a remarkably natural glass eye, reconstructed his hands and patched together half his face from skin grafts.

Like many wounded soldiers, he describes his surgical care as "phenomenal." And like many soldiers, his TBI went undetected. An entire year passed before doctors diagnosed him with mild to moderate traumatic brain injury.

Considering that football players can sustain TBI from tackles, it seems shocking that doctors didn't assume the same thing would happen to someone who died three times after being blasted by a bomb.

"I was alert and could have a normal conversation," Robert says, by way of explanation. "But they also didn't know me beforehand."

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When a bomb explodes, it sends a pressure wave that tsunamis through a soldier's body, killing brain cells and severing connections between neurons. Rocks, metal and bone shards pierce the tissue. The brain pinballs inside the skull. Trauma triggers spasms in blood vessels and a cascade of toxic neurochemicals. Soon, the brain swells to the point that surgeons must sometimes cut off the top of the skull to give it room to expand.

TBI symptoms can manifest in myriad ways, depending on where the brain was damaged. Sufferers may experience memory loss, new learning problems,

blackouts, headaches, inability to concentrate, disinhibition, inappropriate behavior, aggression, depression and addiction.

Though some testing began in late 2007, there is no mandated pre-deployment assessment to measure soldiers' baseline cognitive and psychological functioning. Consequently, doctors had little idea whether their blast-injured patients had previous problems with, say, attention or aggression. Also, though there are reams of research on civilian TBI – injuries caused by falls, vehicular accidents and assaults – research on blast-induced TBI is relatively new. Soldiers themselves often have limited knowledge of TBI and may even try to camouflage their deficiencies.

But even if doctors don't notice the symptoms, TBI sufferers often feel them acutely. "The hard part is that you remember how you used to be," says Robert. "If that [memory] got knocked out, it'd be easier to deal with."

Instead, it's his short-term memory that has deserted him. "I used to be a bartender, so I remembered names really easily," he says. "I knew 99 percent of the regulars who came into the pub and what they drank." Now, he has trouble recalling the names of even old friends and colleagues if he hasn't seen them recently.

His concentration lapses and his mind scurries sideways from subject to subject. Sometimes he has to read the same page 15 times because the words won't register. "I have almost like a speed bump in my thought," he explains. "The record's spinning, then it hits a bump and it skips for a little bit."

Organizing his day, juggling tasks and keeping track of where he put things is like gathering quicksilver. To make matters worse, he now has a much shorter fuse, which gets sparked by the littlest things.

As with many TBI patients, it's his wife, Jordan – whom he started dating and married only after his injury – who must deal with his unpredictable outbursts. "The house could be totally burning to the ground and I'd look at my wife and say, 'You know honey, it's gonna be OK. We'll be all right.,'" he explains. "But she puts away a paper of mine that she shouldn't be touching at all, and I lose my lid."

It's difficult to determine if Robert's anger erupts from his TBI or his posttraumatic stress disorder. Symptoms like aggression and depression can be caused directly by either – or both.

“With PTSD, aggression is more of a defensive reaction,” explains Dr. Kathleen Goren, a neuropsychologist at the Phoenix VA Medical Center. “With TBI aggression, a person is disinhibited and can’t control their anger.”

Either way, the outbursts can look the same.

Some of Robert’s symptoms are clearly PTSD. His mind plays out war scenes in the form of nightmares and daydreams. He gets uncomfortable in crowds and won’t go outside without at least a pocketknife. Each time he enters a room he finds himself analyzing who might be dangerous, whom he’d have to take out first if they were the enemy.

As he drives, he’s ambushed by visions. Vehicles tailgating him or cutting him off trigger flashbacks of car bombers. Freeway overpasses morph, in his mind, into bridges from which Iraqi insurgents drop grenades. Only after white-knuckling it under several of them does his body begin to relax.

“We’re not crazy,” he stresses. “We’re just in defense mode.”

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For therapists and wounded soldiers, combating TBI and PTSD is like battling a combined front, an elusive enemy. It’s too simplistic to think of one as physical and the other as psychological, since TBI alters moods and PTSD changes the brain’s chemistry. Therapists usually attack them with separate strategies: behavioral and psychological therapy for PTSD, cognitive and sometimes physical therapy for TBI.

At the VA Medical Center in Phoenix, Dr. Kathleen Goren teaches Brain Boosters classes to Robert and other soldiers with mild TBI. These cognitive therapy classes, which meet twice weekly for 10 weeks, are essentially like neuro fitness training. And like dance aerobics or cardio kickboxing, they’re designed to be fun.

“We want to give them things that they’ll enjoy doing,” says Goren. So the soldiers play games like Nintendo’s Brain Age and Sudoku to strengthen and build neural connections. “With Sudoku,” explains Goren, “you have to be logical, focused on detail and have frustration tolerance.”

The process of retraining the brain is painstakingly slow and must be maintained indefinitely. For TBI patients with memory deficits, there’s no key to the mental

vault of forgotten words. Relearning the word for "apple," for example, brings one no closer to relearning the word for "airplane" or even "orange."

So doctors give the soldiers adaptable strategies, such as visualization and association. "The more deeply you process something – writing it, saying it, seeing it – the more likely you are to remember it," says Goren.

When these so-called restorative training techniques aren't sufficient, therapists recommend compensatory strategies – essentially "crutches" – such as alarms and handheld computers. Robert must schedule everything in a Palm pilot, make to-do lists and write down names and numbers if he is to remember them.

For honing concentration, some of the best training grounds are books, both print and audio. Therapists might play an audio book and tell patients to devote their attention to it for one minute, then quiz them on comprehension. Slowly, they extend that to two minutes, then four, then 10.

When Robert tackles a book, he's learned to read short, easily digestible passages. Then he stops, makes sure he's absorbed what he just read and relates it back to the previous page before he moves on.

Despite the slow process, he says he's more into books now than he was pre-injury. Looking at his choice of tomes – *The Kite Runner, A Thousand Splendid Suns, 90 Minutes in Heaven* – one wonders if he's reading more to build the connections in his brain or the connection to his experiences.

Getting to know his new self and what he is capable of is key to Robert's recovery. To control his shortened temper, he's learning to recognize warning signs, catch himself before he gets too upset and either talk himself down or walk away. "I take myself out of the situation if I see myself getting warmed up," he says. "It gets easier and easier, but it's something you've got to work on."

Because Robert has chosen to do much of his cognitive therapy on his own, he says the most challenging thing about rehab is mustering the motivation to do it. He procrastinates or forgets. Plus, he's so busy with surgeries and lobbying the government, military and VA to improve policies, it leaves little time for healing. "Instead of putting myself first and taking care of my head, I put other things that I can fix first," he says.

But though he does his TBI therapy independently, Robert can heal his PTSD only among friends. He attends group therapy with other vets because "we recognized that we all had the same symptoms," he says. They catch each other's tendencies and can help explain the reasons behind automatic reactions often misunderstood by civilians.

Just as he felt when he awoke in Walter Reed, distrusting the doctors and longing for the security of his fellow soldiers, Robert doesn't put much faith in psychiatrists who've never seen combat. "They're not sensitive to our issues when they need to be," he says. "We get desensitized by war, but maybe they get desensitized by people being sick mentally. The only people who can really tell you how to deal with it are people who've been there."

Robert tells of a Native American who returned from fighting in the Vietnam War and sat down with his whole tribe to tell his horror stories. "So it wasn't just his pain anymore," observes Robert. "It was everybody's pain." He marvels at the trust of a community where a soldier could "spill the most horrible things ever envisioned and never be judged." How can people from other cultures do that? "With other veterans," says Robert. "That's our tribe."

But even after the bomb, the bloodshed, the scores of surgeries, the forgetting, the flashbacks, the endless retraining and relearning, what Robert's battle-scarred brain wants most of all is to be back in Iraq.

"If you would just write," he requests, "that I wouldn't change a thing and I wish I was with my guys right now in Iraq, I would appreciate it. The hardest thing to deal with is not being with my guys. It's not the surgeries. That's nothing compared with not being with your guys and doing your best to bring them home safe."

A part of Robert will always remain in Iraq. The part that felt useful, full of purpose, part of something bigger. The rest of him must now turn attention inward, to the little things – the memorization of words, the rebuilding of tiny neural connections, the quotidian tasks on a to-do list.

Dr. Goren says one must think of the brain as a system that's been trained over a lifetime. If it's damaged and a person has had only a year to relearn, he's not going to have gained back a lifetime of development. She says patients like Robert with mild traumatic brain injury can eventually get back to a normal range, "with the understanding that they won't be the same."

Many of these soldiers had plans to finish out their careers with the military and are now coping with never being able to work again or finding jobs in sectors for which they have no training or interest.

Robert wanted to go into the special forces, but he can't beat up his body anymore and doesn't want his PTSD to get worse. That means no more military fieldwork, no more volunteering with the fire department.

"I have to put everything into perspective: the injuries I have and taking care of my wife the rest of her life," he says. "The best outlook is a boring job doing IT, and I'm a total blue collar guy."

That's not to say his outlook is grim or that he sees himself as a victim. "I have no regrets," he says. "I'd do it all over again in a heartbeat, even if I knew I wasn't going to come back. When you're in the military, you're part of something much bigger. You're doing it for so many people that it's such a selfless act."

If it weren't for his injury, he says, he would have stayed in Iraq and never married his wife. "She's the best thing that ever happened to me," he says.

His "death," too, was a kind of rebirth. Even though his rehab is frustratingly slow, he finds it easy to rejoice in the most incremental triumphs. "I was a very positive person beforehand, but now I'm even more so," he says. "Life is so precious. Everything is a lot brighter and more beautiful."

Dr. Goren believes that "Robert will succeed because he's motivated." But he must maintain that motivation every day as he continues to rebuild his brain, his identity and his life, indefinitely. His layers of scars will fade, but they will never go away.