

Hanging by Threads
by Keridwen Cornelius

On the surface, there was no reason Zach Sowers should be unconscious. His CT scan was clear. His MRI looked promising. His injuries had healed since he was rushed to the hospital with eyes like purple golf balls protruding from his basketball-sized head.

For 10 months, his wife, Anna, couldn't believe it. In unguarded moments by his bedside, she would grasp his hand and cry out, "Why won't you wake up?"

Zach's unconsciousness was caused by diffuse axonal injury, a common yet mysterious type of traumatic brain injury. TBI has become known as the signature casualty of the Iraq War. Yet far from the battlefield, various forms of traumatic brain injury strike more than a million Americans a year, causing 50,000 deaths and 80,000 disabilities annually. It's the most frequent cause of death among young people – victims of car accidents, shaken baby syndrome or, in Zach's case, horrific violence.

It was Friday, June 1, 2007. Anna Sowers, 28, was visiting friends in Chicago while her husband Zach, 27, was back in Baltimore, strolling home after having a few drinks with Anna's brother. Married the previous October and still in the flush of newlywed bliss, Zach and Anna had been texting each other all evening. Shortly before midnight, Anna texted Zach the news that former basketball star Scottie Pippen was in the same bar with her. Zach was an avid sports fan, so she knew he'd be thrilled.

He didn't respond.

Just outside the Sowers' house in Canton, an up-and-coming Baltimore neighborhood, a burly 16-year-old named Trayvon Ramos asked Zach for a cigarette, knocked him down, then for no reason at all, kicked him to within an inch of his life. Another teen stood by while two more watched in a nearby car. They stole his cell phone, watch and wallet but spent only about \$90 – on DVDs and gas.

If Ramos's reasons for assaulting Zach were vague, his target was precise: Zach's head. Anna's brother later told her that her husband had been "curb stomped" – the

attacker forces the victim's mouth against a street curb, as if he's biting it, then stomps on his neck.

For two agonizing days, Anna called hospitals, the police and all their friends and relatives. Finally, after imagining Zach in a dumpster somewhere, Anna was told he'd been admitted to Johns Hopkins Hospital as a John Doe. At first, she was relieved.

As she walked down the hospital hallway, peering into rooms, she passed straight by the man with the bandaged face "the size of a basketball." When the nurses led her back in, she thought they'd made a mistake.

"I told them, 'This isn't Zach,'" she says. "Then when I got closer... I saw the stubble on his chin and his scar from shoulder surgery, and that's when I realized it was him."

Reeling from the shock, Anna clung to the doctors' reassurances. Zach didn't have any skull fractures. The surgeons didn't need to remove a piece of skull to give his brain room to swell; the catheter was effectively draining blood from his head.

"I just remember hearing all these good things [the doctor] was saying," recalls Anna. "It just seemed like, 'OK. I think everything is going to be OK.'"

Dr. Marek Mirski, director of the Neurocritical Care Unit at Johns Hopkins Hospital, was equally optimistic: "Everyone was impressed by how little injury showed up on [Zach's] imaging. Sometimes I was kicking myself after those first few weeks, because I thought that he would perk up, given his scans. So it hit me really hard when he just plateaued."

Diffuse axonal injury (DAI), which occurs in almost half the cases of severe head trauma, is almost invisible. It's often diagnosed by default: If the MRI and CT scans show tissue too healthy to warrant unconsciousness, and doctors detect subtle clues like microscopic hemorrhages, they assume the damage must be in the axons.

Axons, also known as nerve fibers, are thread-like projections that transport electro-chemical messages in the brain. Most are slender and microscopic, reaching only to a nearby nerve cell, or neuron. When violent forces twist and batter the head, the axons can stretch or shear, severing communication lines

between the thinking centers of the upper brain and the consciousness-controlling motherboard of the brainstem.

The region near the nape, where the brainstem is located, is particularly vulnerable to violence and vehicular accidents, says Mirski. “Think of the head and neck as shaped like a lollipop,” he explains, holding up a piece of Halloween candy. “If I hit the top of this, where’s it going to bend and break? Where the neck meets the head.”

Electro-chemical messages continue to travel along the nerves, but they get stopped at the axon breaks and start to jam up. This causes the axons to swell to the point that they split down the middle, the separate strands coiling back into “retraction balls.” The damaged axons then degenerate, and their target tissue begins to atrophy like an unused muscle.

In addition, calcium and sodium begin to leak into the ripped axons’ membranes while potassium drains out. The chemical imbalance kills healthy brain cells as it finishes off the dying ones. The brain can’t repair dead neurons, but it can sprout new axons to bypass the damaged ones.

A month after the attack, a comatose Zach showed signs he was regaining higher brain functioning. He brought his hands to his chest in response to pain – a reaction doctors call “localizing.” But the next day, he went into septic shock and plunged into a vegetative state – one step up from coma in responsiveness, one step back in likelihood of recovery.

A coma is a deep state of unconsciousness that rarely lasts beyond a few weeks. Patients in a vegetative state might open their eyes, respond to intense stimuli and experience sleep-wake cycles, but they can’t speak or follow commands. They might eventually awake and regain some of their abilities, or they might remain in the condition permanently.

In late summer, Zach was transferred to a long-term care ward of Johns Hopkins Bayview Medical Center, which is where he is on a bright, crisp day in November. His sunny room is decorated with wedding photos and a quilt superimposed with pictures of him, Anna and their friends made by a woman who read about their story.

Anna and Zach have known each other nearly half their lives, growing up in Frederick, Maryland. She describes Zach as that rare kind of man whom friends relied on for advice about everything from girlfriends to careers.

On a whiteboard on the wall, Anna has written “Zach likes,” followed by a list of his preferences: “To be as clean as possible (he’s a neat freak),” “To listen to music (he’s a DJ during his spare time),” “To talk about NFL, college football, news, celebrity gossip and dogs.”

In photos, Zach is a lanky, smiling guy-next-door arm in arm with Anna, a wide-eyed beauty with delicate Asian features. The Zach lying on the bed on a November day has vacant eyes and a gaping mouth that stretches his face gaunt. He’s moving his jaw in a way that looks for all the world as if he’s trying to talk, but it’s just an involuntary nerve response. He couldn’t talk if he wanted to – a tube protrudes from his neck in case he stops breathing on his own.

Mirski, who works only in critical care, hasn’t seen Zach in several months and is checking to see if there’s anything more he can do. “ZACH. HEY, ZACH,” Mirski bellows, clapping. “GOOD MORNING, ZACH.” Slow, stentorian voice.

Intense stimulation is key with patients in neuro care. Doctors rub their sternum, shake them and stick swabs up their nose to elicit reactions, all the while apologizing loudly for causing discomfort.

“We call it ‘neuro voice,’” says Mirski’s research assistant, Shannon Leroux. “That’s the greeting in the neuro world: a good shake and a sternal rub.”

Mirski opens and shuts Zach’s eyelids. He lifts a pale arm and lets go. It drops limply to the sheet. “That’s actually a good sign,” he explains. “It’s better than someone that’s all curled up and spastic.” He jabs his hand toward Zach’s eyes to see if he blinks or flinches – a response called “threat.” Nothing.

Yet Zach sometimes responds to Anna. When she visits him, his eyes are usually closed, but when she starts talking, they open. “He can’t track you when you move, though,” she says. Also, “He makes faces if I do something he doesn’t like, like brushing his teeth.”

Mirski says it seems as if a veil hangs between Zach and consciousness. “Maybe it takes a trained eye, but there’s a look someone will give you that tells you the

lights are off. And then there are other looks that you say, ‘There’s someone behind that.’ And at times he would give me that look.”

November is a turning point. Once a person passes six months in a vegetative state, chances for recovery dwindle.

“It’s not fair to say that after six months, you write someone off,” says Mirski, “but there’s less and less optimism that, even if there’s improvement, Zach will return to really good function.”

On the other hand, “We’re learning in the last decade that we were being too conservative in thinking that the first six months was everything,” he says. “Now we know that some recoveries can take several years.”

The brain’s ability to repair itself is remarkable. Axons can sprout new branches, forming new connections that allow healthy nerves to take over the job of damaged ones.

But while that’s happening – if it’s happening – Anna’s life is on hold. Mirski and his colleagues tell her she should think about moving on – not necessarily leaving Zach and remarrying, but moving on. Even they don’t seem to know how she could manage that.

“I have to face the fact that this could be as good as it gets,” she admits.

She has returned to her job in public relations. But she still visits Zach every day at lunch and after work, washing and massaging him, doing range-of-motion exercises on his atrophied arms, talking about her day and about his favorite subjects. She worries she’ll miss something if she skips a day.

Every night she goes home alone to the same house outside of which Zach was assaulted. She won’t move to a safer neighborhood because “if Zach wakes up, I know he’ll feel better being somewhere familiar.” The teens who attacked him are now in jail, but violence still plagues the area. Anna now carries mace and is learning krav maga, an Israeli self-defense technique.

Thanks to financial help from the community and Zach’s insurance – he was a financial analyst for Johns Hopkins University – Anna has so far been able to pay the hospital bills. But the insurance will expire soon. She has no idea how she’ll cope then.

“I’d like to think that there’s still some opportunity here in the next six months,” says Mirski. “Because to me it looks like some little extra connection just needs to turn on, and all of a sudden he looks toward you one day, and he’s there.”

For now, all Anna can do is put faith in the ability of millions of microscopic axons to reunite. And keep waiting for Zach to respond.

In December the doctors run a cerebral perfusion scan on Zach, injecting dye into his bloodstream and tracking its flow, since blood only flows to healthy tissue. They find that he still has viable brain tissue, but the flow is disrupted in the front, back and sides of his brain.

In January, they start Zach on Ambien, the anti-insomnia pill that paradoxically awakens some patients in vegetative state, though only for a few hours. Formerly unconscious people have been able to have conversations, recognize loved ones and recall their favorite sports stars. The drug appears to reshape and reactivate damaged receptors for an inhibitory neurotransmitter called GABA, though many doctors remain suspicious of its efficacy.

The Ambien seems to unlock Zach’s rigid joints, but it fails to wake him.

That month the doctors meet with Anna and Zach’s parents. “They said the same things they said back in October,” says Anna. “It was like déjà vu.” In the back of her head is a thought that has been there since July: *If Zach doesn’t wake up, how long do we keep him like this?*

But no one can say it aloud. They all keep waiting for Zach to respond.

Spring brings no more signs of life. On March 11, the family decides to remove Zach’s feeding tube, and they all take turns by his bedside, waiting for Zach to die.

On March 25, surrounded by his wife and family, Zach Sowers stops breathing. He never became conscious.

SIDEBAR: Lives Forever Changed

On December 10, 2007, a judge handed down the verdict on Zach’s attackers, who were caught after police traced charges on Zach’s credit card.

Trayvon Ramos, 16, who curbed-stomped Zach and had previously been arrested for carjacking a woman, was tried as an adult and sentenced to 40 years in prison for attempted murder and robbery, eligible for parole in 24 years. The plea bargain stated that the charges would not be changed to murder if Zach died. The other teens involved – Eric Price, 17; Arthur Jeter, 18; and Wilburt Martin, 19 – each received eight-year prison terms for robbery.

Anna was “disgusted” with the verdict, so much so that she’s planning to take the LSAT and apply for law school. She has joined forces with Baltimore Sen. George Della to draft legislation called Zach’s Law, which would allow murder charges for attackers who put victims in a vegetative state. She has launched grassroots efforts to reduce crime in Baltimore and to end the community’s “Stop Snitching” culture of violence against people who report crimes. Anna has also collaborated with Johns Hopkins Hospital to create the Zach Sowers Brain Injury Research Foundation.