The ER Drama You Won't Believe

Faced with a teen's shocking head injury, surgeon Curtis Dickman came up with a daring fix

by Alexis Jetter

SUMMER IN Phoenix can be scorching hot, even after the sun slips behind the Maricopa Mountains. For teenagers on the western end of town, where the barrio meets the desert there is little to do and few ways to stay cool-except to drive. That's exactly what Marcos Parra and his friends were doing an hour before midnight one night in July three years ago.

Waiting for a traffic light to change, Parra, a playful kid with slicked-back hair and hazel eyes, flipped on the air conditioning in the '97 Nissan Altima. His cousin, Francisco, slid a rap disc into the CD player while their friend Ruben lounged in the backseat. When the light turned green, Parra pressed the accelerator.
Then everything blew apart.

A drunk driver going 40 miles an hour ran the red light and slammed into the driver's side of the Nissan. The impact rammed Ruben's legs under the driver's seat, seriously injured Francisco and knocked Parra into semiconsciousness.

Rescuers that night of July 12, 2002, could only guess at the extent of Parra's injuries. Except for minor cuts, he wasn't even bleeding. But all the ligaments supporting the 17-year-old's head had been severed. His skull was literally detached from his spine.

The paramedics stabilized his head. Dean Hudson, one of the paramedics at the scene, said later, "There was enough force to internally decapitate him."

Only Parra's neck muscles kept his head connected to his body. A single wrong move could trigger instant death or paralysis.

Paramedics made a quick, fateful calculation. With three trauma centers nearby, they headed for St. Joseph's Hospital and Medical Center. The choice would prove crucial. That night, neurosurgeon Curtis Dickman happened to be on call.

SHORTLY AFTER MIDNIGHT Dickman's home phone rang. An emergency-room resident told him about Parra, whose X-ray confirmed a complete separation between the top vertebra and the skull. Dickman, 43, who directs

spinal research at St. Joseph's world-renowned Barrow Neurological Institute, was intrigued.

Dickman and surgical resident Fernando Gonzalez had spent the last two years testing a technique to treat injuries exactly like Parra's. And only three days before, they'd put the finishing touches on a medical article that would introduce their idea to the world.

The approach was simple, but daring. Instead of traditional spinal surgery, which employs hooks, plates, horseshoe-shaped rods and wires, Gonzalez proposed that they limit themselves to using just two titanium screws, each an inch long, to reattach the skull to the spine.

Mobility was key. The spine's greatest flexibility is centered at the first and second vertebrae of the neck. That's where the head pivots, allowing side to side and up and down movement. Conventional surgery fuses these vertebrae to the skull, forcing patients to swivel their bodies to look around. The new approach avoided such rigidity by reconnecting the skull to the top vertebra only. In theory the patient would lose only five to ten percent of normal motion.

There was a danger, however. The vertebral arteries, which snake out of the spinal column and into the cranium, carry the brain's blood supply. A misplaced screw that pinched an artery could trigger a stroke, coma, paralysis, even death.

And there was one other catch. Dickman and Gonzalez had used this technique on cadavers, but never on
a living patient.

"Most people with this type of injury die at the scene of the accident," Dickman says. The ligaments supporting the head are the strongest in the body. A force that is violent enough to sever them usually kills.

In fact, until the late 1980s, when paramedic procedures and rapid transport improved, there were only about 15 reported cases worldwide of people who survived skull dislocation. Now, two to four such patients a year make it to St. Joseph's alive, but their prognosis is often bleak. Some arrive paralyzed; others, in a coma. At the very least, their complex spinal fractures prohibit the simple but radical fix that Dickman and Gonzalez were advocating.

Unlike most of them, Marcos Parra was in remarkably good shape. The impact had fractured his pelvis, tailbone, clavicle and five ribs—but his spinal

cord, nerves and vertebrae were perfectly intact. The only bony mass floating free was his skull.

More astonishing, no veins had ruptured. There was no loss of sensing ability: Marcos could talk, hear, taste and smell. It was about as clean a case of head dislocation as Dickman had ever seen.

And as a surgical specimen, Parra had another quality that made him well suited for the new technique. "Marcos is beefy," says Dickman, with a smile. "He has big, strong bones." Greater bone mass would make it easier to drive screws through Parra's spine without getting dangerously close to nearby nerves and critical arteries.

But there was no time to delay. The slightest movement could cause Parra's head to slide, instantly cutting off his breathing.
Dickman reached a quiet conclusion. If, after careful examination on the operating table, Parra still appeared to be an ideal candidate, he would become the first person to undergo the experimental technique.

ON THE MORNING after the accident, Parra lay in a critical-care-unit bed, his head totally immobilized. To keep him stable, doctors had inserted six screws into his skull and assembled a halo brace—a metal ring that connects the skull to the chest with pins and bars. Surprisingly, Parra didn't feel any pain and was his usual breezy self, teasing his mother, Rose Cuevas, chatting with his pastor, Rev. Arthur Tafoya, and vowing to beat Tafoya's son at basketball as soon as he got out of the hospital.

"He didn't look like he was that hurt," says Rev. Tafoya, a gentle, fatherly man who had helped Parra leave a life of schoolyard fights and casual drugs one year before.

When Parra had raised his hand, however, a nurse snapped, "He's close to death. He shouldn't be moving."

The severity of the boy’s injury was further underscored by Dr. Dickman's stark assessment, which shocked the family. Without surgery, there was over a 90 percent chance that Parra would never walk again, he said.

Parra asked Rev. Tafoya to pray for him. And the next morning, as his gurney was whisked down the hallway to the OR, his mother and Rev. Tafoya ran alongside, clutching his hands.

IN THE OPERATING ROOM, still encased in his halo, Parra was anesthetized and placed on his stomach. Dickman made an incision in the

back of Parra's neck, parting the muscles to reveal the bony surfaces of the spine and cranium. Another lucky break, the surgeon noted with satisfaction: The bones gapped at just the right angle to accommodate two screws, inserted diagonally.

Dickman drilled two holes through the first vertebra and into the base of Parra's skull. Next he inserted metal guide wire into the holes, and pulled the two bone surfaces tightly shut. The surgeon then threaded the hollow screws over the wires, which he removed, and slowly, carefully, tightened them. It was a good fit.

"I could feel the screws biting into Marcos's bone with incredibly strong power," says Dickman. Finally, Dickman removed a piece of Parra's pelvic bone and wired it over the spot where skull met spine. "The screws are only an internal brace," Dickman says. "It's the bone graft, the bones knitting together, that provides long-term stability."

The operation took three hours, and the exhilaration in the room was palpable. "We were highfiving," Dickman recalls. "We were really excited about it, because it was the first time it had ever been done." A CAT scan confirmed what he'd seen through the OR's X-ray guidance lens: the screws were perfectly seated in the bone.

Gonzalez, who was off that morning, was delighted when he heard the news two days later. "The idea was mine," he says. "But Dickman made it real. He had the courage to try something new."

Still cautious, though, Dickman wanted to monitor Parra's recovery carefully over the next few hours, days and months before calling the operation a success. Parra woke up with a slew of doctors pinching his toes and feet. "Can you feel this?" they asked. "Can you move this?"

Only then did he learn the length of his road ahead. The halo brace would stay on for three months. Not until it was actually removed would he know for sure if he was out of the woods. Parra, whose spirit was undimmed by his ordeal, was itching to get back into action.

Recovery wasn't a cakewalk, however. Parra was bedridden or confined to a wheelchair for three months, partly from the pelvic fracture. Gradually, he moved up to a walker, then a cane. But it was hard to sleep or shower, and sometimes he grew discouraged. The worst moment came when Dickman removed the teenager's head brace. "I was afraid my head would fall," Parra says. "That it would have no strength, and that I wouldn't be able to move it." For one terrifying instant, his head did slump forward. But then Parra

slowly raised his chin and flashed his trademark ear-to-ear grin: X-rays showed the bone graft had healed perfectly.

Dr. Dickman's team has since successfully performed the surgery on two other patients.

Today, there's a spot Parra can't quite feel at the back of his neck, and he can't turn his head all the way in one direction. But he knows that's a small price to pay for the gift he's received. Now he's able to make plans for the future: He wants to become a minister.

"You value everything you have, because it could all be gone in a second," Parra says, standing at the bleak intersection where he nearly lost his life. "You pay more attention to things, and you're more thankful for life and the people who are good to you.

"I should be dead," Parra says simply. "But I'm not."