

'An absolute miracle child' ^{5/17/89}

Valley boy's skull, spine are reattached

By Peter Aleshire
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It seemed a hopeless situation when the team of neurosurgeons first looked at the images of the severed connections between 10-year-old Timmie Mathias' skull and spine.

It wasn't just that the ligaments connecting the boy's skull to his spine had been pulled loose when he was dragged for 15 feet behind the car that struck his bike.

What really crushed the hopes of the six-member team of Barrow Neurological Institute brain surgeons was the golf-ball-size blood clot pressing against the totally paralyzed boy's brain stem.

No one had ever survived such a combination of injuries.

"His head had just been pulled off his spine. All of us were shocked," Dr. Harold Rekate said. "We looked at one another and thought, 'No way we're going to pull this out.'"

But they did.

The surgeons came up with a daring plan to drain away the blood clot, reattach the boy's skull to his spinal column, brace his spine with a metal strut, and cover the whole affair with a piece of bone taken from Timmie's thigh.

The five-hour operation, performed on April 21, exceeded the doctors' fondest hopes, they said at a press conference called Tuesday, when it was clear that Timmie was going to live.

Although he has not fully regained consciousness, the boy has regained the full use of the right side of his body and partial use of his left side.

He lies now in a bed in the intensive-care ward, partially immobilized. He moans continually, moving his arms and feet restlessly while he opens and closes his eyes.

Timmie now is expected to make an almost complete recovery, although he faces months of hospitalization and exhaustive rehabilitative therapy. However, he will not regain full mobility of his neck and may not regain full use of all his muscles, doctors said.

"He's an absolute miracle child," said Dr. Robert Spetzler, head of the institute, based at St. Joseph's Hospital and Medical Center in Phoenix. "By all rights, he should be dead."

'Now it's up to him'

"It's a miracle," agreed his mother, Kerry Mathias, 29.

"Now it's up to him. He's just got to fight; just keep on fighting."

Only 12 other people ever have survived injuries that snapped the tough ligaments that keep the skull anchored to the spine, Rekate said. None of those patients had to endure surgery to remove a blood clot in the brain, not to mention the surgeries to repair a ruptured stomach and spleen.

The bill so far is about \$100,000, according to hospital spokesmen. The ultimate bill undoubtedly will be much higher. The state will pay for most of it through the Arizona Health Care Cost Containment System, the welfare-based medical system that provides coverage for people overwhelmed by medical bills. Although both Timmie's parents work full time,



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Kerry Mathias visits her recovering son, Timmie, at Barrow Neurological Institute (above) as Drs. (from left) Harold Rekate, Volker Sonntag and Robert Spetzler explain the surgery used to reattach the boy's skull to his spine. Timmie now is expected to make an almost complete recovery.

the family has no medical insurance.

The remarkable surgery illustrates the importance of the proper handling of head injuries and the speed with which the medically impossible can become the latest surgical technique, Timmie's doctors said.

An estimated 10 percent of the children who die of head injuries in accidents suffer this kind of once-virtually-inoperable separation of the head and spine, Rekate said.

"Now I believe we can save many of those children," said the pediatric neurosurgeon, one of the doctors who helped performed the first reattachment of a skull and spine in 1975.

"Even a year ago, this would have been declared impossible," Spetzler said.

Timmie's mother said she's still not sure how Timmie got hit by the car while riding his bike to Horizon Elementary School in Glendale at about 7:30 a.m. on April 21.

Fortunately, a Samaritan Air Evac medical team was called to the scene almost immediately. The paramedics did everything right, Rekate said. They re-established an adequate supply of air and used a special collar and vest to immobilize the head and spine.

In many ways, it was the most critical part of the entire procedure.

Even a small movement in the wrong direction would have killed the boy or left him permanently paralyzed, Rekate said.

An experimental machine

Timmie was rushed to St. Joseph's trauma center, where surgeons repaired his spleen and stomach.

Then the neurosurgeons took over.

Fortunately, Barrow was experimenting with a new machine for taking pictures of the inside of the body, a compact version of a Magnetic Resonance Imager.

MRIs make images by using magnets to make water molecules inside the body flip back and forth. The flip-flopping water molecules generate faint radio signals, which the machine can translate into an image.

Unfortunately, most MRIs use magnets so powerful they would disable the life-support machines keeping the stricken boy alive.

But three months ago, Barrow agreed to test an experimental MRI powered by a magnet with no more kick than a child's toy magnet.

The image revealed the blood clot pressing against Timmie's brain just above the back of his throat, where it would never have been detected without the MRI, Rekate said.

That left the surgeons with two problems.

First, they had to thread their way through the bones surrounding the spinal cord in order to drain off the blood clot and close the ripped blood vessels that had created the clot.

Next, they had to reattach the boy's skull to his spine.

They succeeded on both counts.

To reattach the skull and spine, the team employed a 6-inch-long brace shaped like the spoiler on the back of a motorcycle. The metal brace, designed by a Barrow neurosurgeon, Dr. Volker Sonntag, was wired to Timmie's spine and skull. It was then covered with bone marrow taken from Timmie's hip. The bone marrow will harden and cover the metal brace.

Timmie remained paralyzed after the surgery. Doctors didn't know whether that was because the irreplaceable nerve fibers in his spinal cord were damaged or merely bruised.

But the boy has regained the use of his muscles rapidly.

"Before the surgery, they told me there was only a 5 percent chance he'd live," his mother said. "So when they told me he was alive afterward, that was all I wanted."

"Now, I know he's going to be fine. He's a fighter. He's going to be fine."