

Four-day old infant receives new skin in historic LLUCH surgery

It was another first at Loma Linda University Children's Hospital.

A new surgical device, designed for joining blood vessels, was used to graft skin onto an infant born without skin on 30 percent of his body.

Juan Santiago, from Indio, California, was born on November 25, 1996, with a condition called *cutis aplasia*—an absence of skin. His abdomen, sides, and a few spots on his thighs looked like open wounds, doctors report.

The condition is so rare that “the odds of its occurrence have probably never been calculated,” says Douglas Hendricks, MD, associate professor of plastic and reconstructive surgery at LLUCH, and Baby Juan's surgeon.

Hours after he was born, Baby Juan was rushed to Loma Linda. At four days old, he underwent life-saving skin graft surgery.

The condition, according to Dr. Hendricks, came as a complete surprise because the child was a full-term, normal-weight delivery. “Missing skin is very hard to detect in ultrasound scans of the fetus—it's not like he had an extra finger.”

Without a skin graft, the child's prognosis was extremely poor.

“Even with sterile precautions, it was only a matter of time before an infection would set in,” Dr. Hendricks explains. “We needed to proceed rapidly with some sort of coverage.”

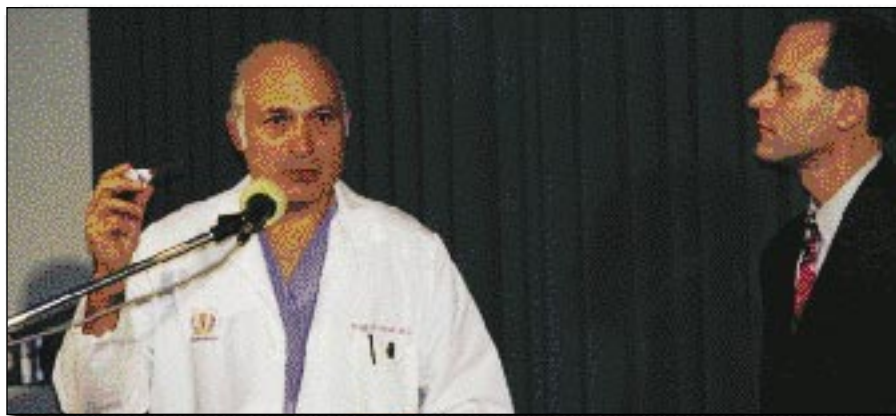
The only places suitable for harvesting skin on Baby Juan were the infant's scalp and the small center strip down his back.

“Normally we don't use the scalp as a donor site out of concern for injuring hair follicles and causing permanent scarring; but in Juan's case we had no choice,” Dr. Hendricks says.

During the six-hour operation, about 20 tissue-thin squares of skin were taken from the baby's shaved head—above the level of hair follicles so none were damaged. These



Parents Juan Santiago and Irma Lopez hold Baby Juan, who was born without skin on much of his body. He was treated with new techniques at LLUCH.



Wolff Kirsch, MD (left), chair, neurosurgery, LLUCH, displays a surgical clip at a news conference held December 23, 1996. The device was used by Douglas Hendricks, MD (right), associate professor of plastic and reconstructive surgery, during the surgery.

sections, along with skin from the back, then had to be pieced into a quilt-work sheet large enough to cover the entire open area, Dr. Hendricks recalls.

There was a problem, however: How to attach the skin to the tiny baby. Sutures or stitches could have torn delicate tissues. Using staples could pierce a lung or an intestine.

So Dr. Hendricks was forced to innovate. He performed the surgery with recently developed surgical clips he had previously tried only experimentally in skin grafts on adults where other methods also would have worked. But he had never before used them on a newborn as a life-or-death last resort.

Called the vessel closure system, the clips and the device that applies them like a staple gun were invented by Wolff Kirsch, MD, chair of neurosurgery at LLUCH; Yong Hua Zhu, MD, associate

research professor at Jerry L. Pettis Memorial Veterans Medical Center; and Robert Cushman, an engineer from Albuquerque, New Mexico.

The clips were first used in June on a kidney transplant patient at Loma Linda. The tiny C-shaped titanium clamps, which resemble “ant jaws,” are used to join blood vessels.

The clips have been on the market for about a year. The trio has been working on the technique since 1982.

Baby Juan was discharged from Loma Linda University Children's Hospital on December 23, just in time for Christmas.

At a press conference held the day Baby Juan went home, his parents, Irma Lopez and Juan Santiago, were jubilant.

“We are so very grateful to the doctors and the staff—we can't say enough to thank them,” Ms. Lopez said. “I can't wait to get him home and have him in his crib.”