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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 Loma Linda University Medical Center.

Baby Juan's new skin

► Missing 30% at birth, he undergoes groundbreaking surgery at Loma Linda.

By Mike Schwartz
The Press-Enterprise

In a world's first, doctors at Loma Linda University Medical Center used a new surgical device, designed for joining blood vessels, to graft skin onto an infant born without skin on 30 percent of his body.

Juan Santiago of Indio was born Nov. 25 at Eisenhower Medical Center in Rancho Mirage with cutis aplasia, an absence of skin.

The condition is so rare that "the odds of its occurrence have probably never been calculated," said Baby Juan's surgeon, Dr. Douglas Hendricks, associate professor of plastic and reconstructive surgery at Loma Linda University Children's Hospital.

Just several hours old, Baby Juan was rushed to Loma Linda. At four days old, he underwent life-saving skin graft surgery. He

was discharged from the hospital Monday. "This will be a Christmas present to his parents," Hendricks said during a news conference, smiling at the baby and his parents, Irma Lopez and Juan Santiago, who were seated nearby.

"We're so very grateful to the doctor and the staff," Lopez replied. "We can't say enough to thank them."

In most of the few cases of cutis aplasia, the scalp is affected. Although Baby Juan had a small strip of skin missing from his scalp, most of the affected area involved his trunk — from the nipple line to the pubic area and wrapping around the sides of his body.

A thin strip of normal skin ran down the middle of the infant's back.

A gelatinous membrane containing blood vessels covered the exposed areas, beneath which lay his muscles.

Hendricks said the condition came as a complete surprise because the child was a full-term, normal weight delivery.

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He said he could only speculate on how the defect might have occurred: Baby Juan had a twin who died after 12 weeks of gestation. The death might have triggered a toxic biochemical reaction in his mother's uterus, Hendricks said. Not only did the dead tissue from the twin disintegrate naturally, but some living tissue from Baby Juan's body as well, Hendricks said.

"Missing skin is very hard to detect in ultrasound scans of the fetus," he said. "It's not like he had an extra finger."

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

Hendricks likened the missing skin to a "significant" 30 percent burn in an adult. Unlike an adult, the infant ran a high risk of infection because his immune system is too immature to form antibodies.

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

Loma Linda notified the burn unit at San Bernardino County Medical Center to have skin from a cadaver thawed and standing by — just in case Baby Juan didn't have enough skin of his own to donate. It wasn't needed.

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 caus-



Dr. Douglas Hendricks displays a surgical clip at a news conference on Monday. The

device is being used in skin graft surgery for an infant born to parents from Indio.

ing permanent scarring. But in Juan's case we had no choice," Hendricks said.

In a 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 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, Hendricks explained.

In adults, metal staples can be used to tie the segments together, Hendricks said. In infants, however, staples would penetrate the abdominal wall, damaging internal organs. Infant tissue also is too thin to hold standard sutures.

So 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 (VCS), the clips and the device that applies them like a staple gun were invented by Dr. Wolff Kirsch, chairman of neurosurgery at Loma Linda University Medical Center; Dr. Yong Hua Zhu, associate research professor at the Jerry L. Pettis Memorial Veterans Medical Center; and Robert Cushman, an engineer from Albuquerque, N.M.

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.

Hendricks noted that new skin already has replaced tissue borrowed for the grafts.

"The baby's head is quite furry," he joked.