

Rebuilding a spine

An innovative surgical procedure by a University physician gives a young girl better health—and a better life



Photo by Jim Bovin

Ten-year-old Aulana Hulbert is feeling much more comfortable after two spinal surgeries to lengthen her spine and make more room for her abdominal organs.

If you think somebody who lacks backbone lacks gumption, you haven't met Aulana Hulbert.

The 10-year-old Nebraskan girl doesn't have the use of her legs but learned how to get around by walking on her hands. And all because she lacks a backbone—at least a complete one.

Born with no spine below her ribcage, Aulana is now getting one at University of Minnesota Children's Hospital. The procedure, being performed in stages by David W. Polly Jr., M.D., allows her tiny torso to grow and make room for her internal organs. Only Polly, chief of spine surgery at the University of Minnesota, had ever performed the procedure.

Aulana's condition, caudal regression, is a rare birth defect that impairs the development of the lower half of the body. Before surgery, Aulana's ribs rested on top of her pelvis when she sat, which she could do only by continually pushing up with her hands.

"Her stomach and intestines and bladder were being squished, and she vomited and had bowel issues," says Aulana's mother, Rachel Hulbert.

Today Aulana is 3 feet tall. But her spine is 7 inches longer, and her torso—from the top

of the thorax to the pelvis—is about 29 percent longer than a year ago, thanks to two surgeries by Polly and his team. Instead of the usual procedure, in which surgeons amputate the legs and use leg bone to make a new spine, Polly and his surgical team figured out a way to craft new spine using one of Aulana's ribs, along with bone from a bone bank.

The donated bone is attached to the upper spine and the pelvis, so it constitutes the whole length of the graft.

Then, "we swing a rib down to it, leaving the rib's blood vessels attached," explains Polly, a professor in the Department of Orthopaedic Surgery and holder of the James W. Ogilvie Chair in Orthopaedic Spine Surgery. "The rib gives the graft a blood supply and provides cells. It should help her turn the graft into her own bone by replacing the donated bone's crystalline structure and growing new blood vessels and bone cells."

Aulana's postsurgical life has definitely improved, her mother says.

"She's only missed one day of school, for flu," notes Rachel Hulbert. "Before, she missed one day a week."

Aulana also finds it easier to sit up without pushing with her hands and to use a wheelchair, though her mother says she's still faster on her hands.

But lengthening the spine also lengthens major abdominal blood vessels, which can only take so much stretch at a time. Therefore, bone must be added gradually; that means Aulana will need at least one or two more surgeries, Polly says.

Which is all right with Aulana's mother.

"We've been happy with the results, and we trust in Dr. Polly," she says.

And Aulana? "She's ready to be taller."