**An Airway Created with a 3D Printer Saved This Baby’s Life**

By [Matt Peckham](http://techland.time.com/author/mcpeckham/)May 23, 2013



UMHealthSystem / YouTube

If you think 3D printing’s overhyped with all this [talk of plastic guns](http://techland.time.com/2013/05/06/3d-printed-gun-successfully-fired/) and [strange, spider-like houses](http://protohouse.tumblr.com/post/31752945698), you clearly haven’t seen this: a tiny airway splint created using a 3D printer that saved a three-month-old’s life.

Doctors at [C.S. Mott Children’s Hospital](http://www.mottchildren.org) in Ann Arbor, Michigan (coincidentally, where my son was born not 10 months ago) paired their medical know-how with the latest 3D printing technology to generate a custom, synthetic bio-part that ultimately saved a child who’d lost the ability to breathe on his own.

Kaiba Gionfriddo, who lives with his parents in Youngstown, Ohio, had a rare birth defect known as tracheobronchomalacia: just one in 2,200 are born with it. In babies with the condition, the airway walls are so weak they frequently collapse when breathing or coughing, shutting down the airway. Parents (and doctors) often miss the condition until the child suddenly stops breathing, which is how, terrifyingly, Kaiba’s parents discovered while eating at a restaurant that their six-week-old baby had it.

“He turned blue and stopped breathing on us,” Kaiba’s mother April Gionfriddo [told the Associated Press](http://www.annarbor.com/news/cs-mott-childrens-hospital-doctors-save-ohio-boy-by-printing-an-airway-tube/), at which point Kaiba’s father, Bryan, had to perform CPR to revive him. But the breathing problems continued, and Kaiba wound up on a breathing machine at Akron Children’s Hospital in Ohio; doctors there told Kaiba’s mother his chances of leaving the hospital alive were slim.

So when one of those Akron doctors, Marc Nelson, mentioned that researchers in Michigan were experimenting with artificial airway splints, Kaiba’s parents wasted no time getting in touch with the hospital and doctors Glenn Green, M.D. and Scott Hollister, Ph.D.

Writing of the situation [on the Univeristy of Michigan’s health blog](http://uofmhealthblogs.org/5563/saving-a-babys-life-with-a-3d-laser-printer/), Green notes that the timing was just right — he and Hollister had “been working on a type of device that would be perfect to help splint little Kaiba’s airway, keeping it clear for air to continually flow to the lungs.” According to Green:

Scott and I had been exploring creating implants using a type of biodegradable polyester called polycaprolactone for a while, but it had never been used in this way before. Because of the urgency of Kaiba’s life threatening condition, though, we were able to get emergency clearance from the Food and Drug Administration to create a tracheal splint for him, using the material.

Using high-res imagery from a CT scan of Kaiba’s afflicted airway, Green and Hollister were able to create a custom splint specifically tailored to fit Kaiba, then print it out on a 3D printer. The operation to install the tiny tube-like splint took place on Feb. 9, 2012, where Green says “[the] splint was sewn around Kaiba’s airway to expand the airway and give it a skeleton to help it grow properly and with greater strength,” adding that the splint is biodegradable — designed to be reabsorbed by Kaiba’s body over the course of three years.

“As soon as the splint was put in, the lungs started going up and down for the first time and we knew he was going to be OK,” wrote Green. Three weeks following the operation, Kaiba came off ventilator support and Green reports he hasn’t had breathing trouble since.

Just to underline the point here, that 3D printing technology, at least as far as medical research goes, is anything *but* overhyped, here’s Green again:

The image-based design and 3-D biomaterial printing process we used for Kaiba can be adapted to build and reconstruct a number of tissue structures. We’ve used the process to build and test patient-specific ear and nose structures. Scott has also used the method with other collaborators to rebuild bone structures in pre-clinical models.

Read more: <http://techland.time.com/2013/05/23/an-airway-created-with-a-3d-printer-saved-this-babys-life/#ixzz2VBJCOVMB>