

THE BREAK-AWAY IV LINE

OKC startup pioneers technology that prevents accidental disconnects for hospital patients

Let's say that you roll into the local gas station, insert the nozzle of the gas pump into your vehicle and begin filling the fuel tank. Just as the tank is topped off and you are about to take the nozzle out of the car, your phone rings with an important call. Distracted, you take the call, wander back to the driver's seat, start your car up and drive off with the nozzle still inserted.

Embarrassing, sure. But it's not a total disaster because fuel pumps at the nation's gas stations are equipped with break-away valves that seal off on both ends. That ensures that a huge fuel spill doesn't happen and guards against a possible fire.

A similar scenario occurs every day in hospital rooms across the nation, says

Ryan Dennis, M.D. Dr. Dennis works at an Oklahoma City hospital as a hospitalist, or a physician who specializes in caring for patients ill enough to be admitted.

Dr. Dennis is founder and CEO of a company called Linear Health Sciences that has created patented break-away technology called the Orchid Valve to prevent accidental disconnects of IV tubing from patients in the hospital.

The concept was conceived after Dr. Dennis saw repeated disconnects among his hospital patients. Statistics show that one in four IV lines is accidentally disconnected from patients, he said. It can be painful, messy, time consuming to replace. And costly.

"We are trying to completely transform the way that patients are connected to their treatments," Dr. Dennis said. "It's costing the hospital about \$50 every time one of these IVs is pulled out."

The company developed an initial prototype and recently closed a \$1.25 million investment round led by i2E that Dr. Dennis anticipates will support

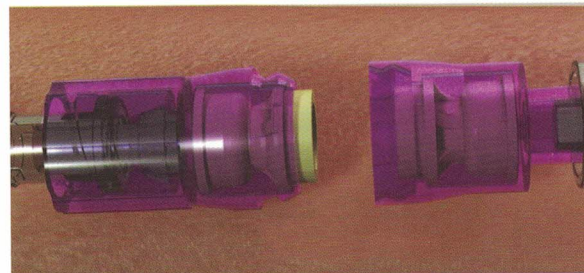
development of the Orchid Valve through the FDA approval process.

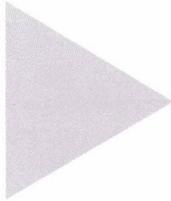
"We are projecting FDA approval in about 12 to 16 months," he said.

Linear Health Sciences' ground-breaking medical technology could have a major impact on an industry that inserts more than 1 billion IV connections annually.

"If we can provide a \$2 solution, and patients are pulling out 25 percent of their IVs, hospitals will be making a significant dent in the problem and actually saving money while they are adding patient savings, satisfaction and convenience for the nurses," Dr. Dennis said. "The value proposition makes a lot of sense to purchasing directors."

A native of Macomb, OK, and graduate of the Oklahoma School of Science and Mathematics, Dr. Dennis earned his undergraduate degree at the University of Chicago before returning to his native Oklahoma to earn his M.D. at the OU. Dr. Dennis is currently an MBA candidate at the University of Oklahoma.





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The Linear Health Sciences team includes Adam Waters, Linear’s Chief Technology Officer, a Chicago based engineer by trade tasked with designing, developing, and scaling the spring-less, non-metallic break away device. Dan Clark, Linear’s Chief Marketing Officer, comes to the team having helped bring medical devices to market for major medtech manufacturers over the past 7 years in several product spaces including infusion disposables.

Linear Health Sciences became an i2E client after a patent attorney at Oklahoma City’s Crowe & Dunlevy made an introduction for Dr. Dennis. The company enrolled in i2E’s Venture Assessment Program, which helped chart a direction for the startup.

“It bought up several key points which really made us look back on things we thought were decided and set in stone,” Dr. Dennis said. “We actually ended up making some key pivots, like owning the manufacturing and getting away from a licensing-based model. That was huge.”

In addition to receiving enthusiastic reception from potential health care industry customers, Linear Health Services was named one of 20 semifinalists out of 430 candidates worldwide for the 2016 Medtech Innovator competition.

After working with Medtech Innovator’s virtual accelerator, the company will be featured at the nation’s

largest medical technology conference in Minneapolis this October. The top five Medtech semifinalists will be selected to present at the conference’s plenary session.

Although the Orchid Valve is still in the prototype stage, medical technology industry leaders are already pursuing the Norman-based company with acquisition overtures.

However, Dr. Dennis plans to build out the infusion disposables product line and follow it up with other innovations.

“Our intellectual property spans across all medical tubing,” Dr. Dennis said. “I think we will probably get the nicest premium on an acquisition when we have proven out urinary catheters, chest tubes and portable insulin pumps. When we’ve proven that no patient should be connected to a catheter that’s not connected by a break-away valve, that’s when we are going to get the value that I think we deserve.”



Ryan Dennis, M.D., CEO
Location **Norman, OK**
Employees **3**
Year Founded **2013**

Product or Technology

The company has developed a non-metallic break-away connection for peripheral IVs that connect hospital patients to their treatments.

Markets Targeted

Acute care hospitals that place more than 1 billion IV lines into patients annually.

Future Plans

In addition to peripheral IV lines, the company plans to apply its break-away connection technology to urinary catheters, chest tubes and portable insulin pumps.

Funding

Linear Health Sciences recently closed on a \$1.25 million seed round led by i2E through the Oklahoma Seed Capital Fund.

Major Milestones

The company has developed a functional prototype, closed on a seed round investment and has been named a semifinalist in the 2016 Medtech Innovator competition.

linearhealthsciences.com