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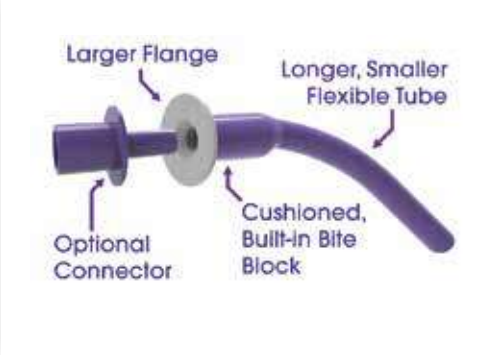
Roxanne McMurray, DNP, APRN, CRNA, never set out to be an inventor. When she saw a need in her practice for a device that could help both providers and patients with airway management, she became an inventor—and the McMurray Enhanced Airway (MEA) was born.

"With the development of propofol and the art of deep MAC anesthesia, maintaining comfort while maintaining a spontaneous breathing airway is challenging for certain populations," she said, mentioning obese, sleep apnea, pediatric and elderly patients as examples of patients with higher risk for upper airway obstruction.



The McMurray Enhanced Airway

"We don't have a device in our arsenal for optimal airway management of these and other patients under deep MAC, so anesthesia professionals have been doing workarounds to keep the pharyngeal soft tissue stented open."

Those workarounds include using nasal airways orally. Current oral airways only go to the base of the tongue, McMurray explained, meaning providers end up holding the chin or jaw to open up the airway beyond the base of the tongue. The patient's chin and jaw can become sore and uncomfortable, and so do the provider's hands.

> *"I've had CRNAs come up and hug me. They say, 'Whoa, we finally have a tool!'"*

The MEA facilitates patient breathing and frees up the provider's hands thanks to its longer length tubing. It is an oral pharyngeal device designed to stent open the soft pharyngeal tissue beyond the base of the tongue. "It's a needed device," McMurray said, adding she wanted to remove the risk of patients swallowing, biting, or inhaling severed nasal tubing when it is used orally. "I thought, 'Let's take those risks out and create a device that we can use that is FDA-registered for deep MAC airway management.'"

As the inventor of the MEA, McMurray recently had the opportunity to present a poster on the device at the World Airway Management Meeting (WAMM) in Amsterdam. She was among a group of 40 presenters in the innovation category. Out of 600 total presenters, she was selected to have her work published in the Trends of Anaesthesia and Critical Care Journal. She said it was a privilege to present her poster, have her abstract printed, and meet attendees from all around the world who share a passion for airway management.

"There were 75 countries that were represented and 2,000 attendees. Despite different languages, we have a common language in airway management," she said.

Over the course of three days, she presented her poster to small groups, describing the components of the MEA, which is a hybrid of nasal and oral airways. It features an elongated cushioned bite block, which allows flexibility in placement between the molars to decrease risk of dental damage. It also includes an option for a 15 mm connecter that helps decrease fire risk when connected to the anesthesia circuit by limiting oxygen diffusion around the surgical field. The connector has an additional benefit for intraoral ventilation.

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"With the connector, you can connect it to your anesthesia circuit and manual resuscitator. You can apply intraoral ventilation and forgo all the variables for difficult mask ventilating with a patient that's obese, edentulous, or has a beard," she said.

During her time at the conference, McMurray met other innovators and entrepreneurs, including a man who worked with Archie Brain, the inventor of the laryngeal mask airway. She was able to share information with these other innovators about the MEA and explain the void providers have with current airways.

"It was very encouraging to hear their feedback and also to hear their thoughts on the process of being an inventor," she said.

Being an inventor takes a lot of work, McMurray said. Commercializing the device has been a long journey, and not always an easy one.

"It's a blessing and a curse to bring something to market," she said. "It takes a lot of work and tenacity. You have to have the drive, you have to have the passion, and you have to see the need."

Her passion for improving patient outcomes and anesthesia airway management practice has been the driving force behind the MEA. McMurray created the MEA in 2013, incorporated her business in 2016, and began selling the device in 2019. She runs her business, McMurray Medical, in addition to working clinically and teaching at the University of Minnesota, where she serves as the associate program director of the university's nurse anesthesia program.

Having enough time is one of the biggest challenges of being an inventor and building her own business in addition to her other jobs, she said.

"Time is a barrier, and it's very expensive to be an inventor because you have engineers to pay, you have regulatory, quality, and marketing people. You have testing and manufacturing, and then there's a lot of writing involved with patents and publishing," she said.

Based on the benefits to patients and the reactions she's received from other CRNAs, her hard work and the time spent developing the MEA have been worthwhile.

"I've had CRNAs come up and hug me," McMurray said. "They say, 'Whoa, we finally have a tool!'" ■