

Generations

Meet HAL – medicine’s newest robotic tool for teaching

A team of researchers and engineers at Gaumard Scientific has unveiled a new robot that raises the bar on medical training devices.

The robot, called HAL (and more specifically Pediatric HAL S2225), has been made to look like a 5-year-old male patient and offers unprecedented training options. For a super demonstration, go to www.gaumard.com and view the video on the homepage.

Gaumard Scientific Company, based in Miami, Fla., has designed, manufactured and marketed simulators for health-care education for more than 60 years, beginning with a synthetic human skeleton developed in 1946.

Users worldwide — the military, emergency medical services, major teaching hospitals and nursing schools — recognize Gaumard products for their innovation in simulation in the pre-hospital, obstetrics and gynecology,

surgical and nursing-care segments.

Robotic HAL not only looks like a little boy, he behaves like one. He can track a finger raised in front of his face with his eyes, answer simple questions about



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how he feels on a scale of 1 to 10, cry, and exhibit medical conditions, such as a swollen tongue one would experience going into anaphylactic shock.

He can breathe faster and/or urinate when scared. And he has also been built in a way that allows doctors and nurses in-training to perform various tests such as taking blood pressure, checking his pulse and monitoring breathing.

Students can also use real medical equipment such as an EKG machine or a heart or blood-pressure monitor — or tools such as a scalpel

or breathing tubes — to perform realistic medical procedures.

HAL is just one of several robots the company is working on. Others include Victoria, a robot mother who gives birth to a baby robot, and Super Tory, a baby who can experience a wide variety of newborn complications.

According to an article on www.medicalxpress.com, with HAL, the company has pushed the bar higher than ever before, offering medical students a new level of interaction with a robot patient before being exposed to real ones.

Representatives told the press that they backed off making the robot look too human, such as leaving off freckles, for example, or real hair, so students wouldn't be too emotionally traumatized should the procedure's results not be as successful as anticipated during emergency pediatric situations.

However, HAL can be

shocked with a real defibrillator or have his throat cut to allow for insertion of a tracheal tube. Trainees can also draw blood and insert urinary catheters or a chest tube to allow drainage of what looks like real blood.

The makers of the robot have put in special parts at certain body sites to allow for replacement, such as patches of skin that are damaged by a scalpel or needle. And as students perform treatment, the robot can react, crying, for example, or saying “ouch” when pricked with a needle. He also might move, not only showing emotions, but mimicking the difficulty often found when treating a person in pain.

Trainers also can speak into a microphone and have their voice come out of the robot sounding like a 5-year-old boy — and they can cause emergency conditions too, such as arrhythmia, or cardiac arrest, forcing students to react quickly.

Inside HAL, a combo mechanical-pneumatic system makes him breathe, and a cartridge in his leg allows him to exhale CO₂. Hydraulic systems provide fake blood and tears. Servo motors tug on his face, helping him to look angry or scared, among other emotions.

He even speaks, with a repertoire that includes shouting for his mother and telling you not to touch him. If you like, you can even speak through the robot, with a system that turns your voice into that of a 5-year-old.

One of the reasons for building Hal was to train medical workers on how to approach children, who may not be forthcoming about their symptoms but may communicate via facial expressions.

To get the expressions right, the company's engineers worked with pediatricians to fine-tune how an angry or happy child's face really moves, i.e., muscles contracting

and brows furrowing.

I played the full video about HAL on the Gaumard site a couple of times. It was a little eerie at first, and I kept thinking about a “Twilight Zone” episode that I had seen as a kid that scared the heck out of me.

However, realizing how beneficial HAL and other robotic tools will be to both future nurses and doctors, it truly is an amazing learning tool. I especially liked it when HAL yawned, signaling tiredness to the examiners.

While HAL may be part of the wave of the future in medical training, another article I read presented another point of view nicely: “In the end, machines can't teach us about the often-overwhelming emotions and stress in medicine — only our fellow humans can.”

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