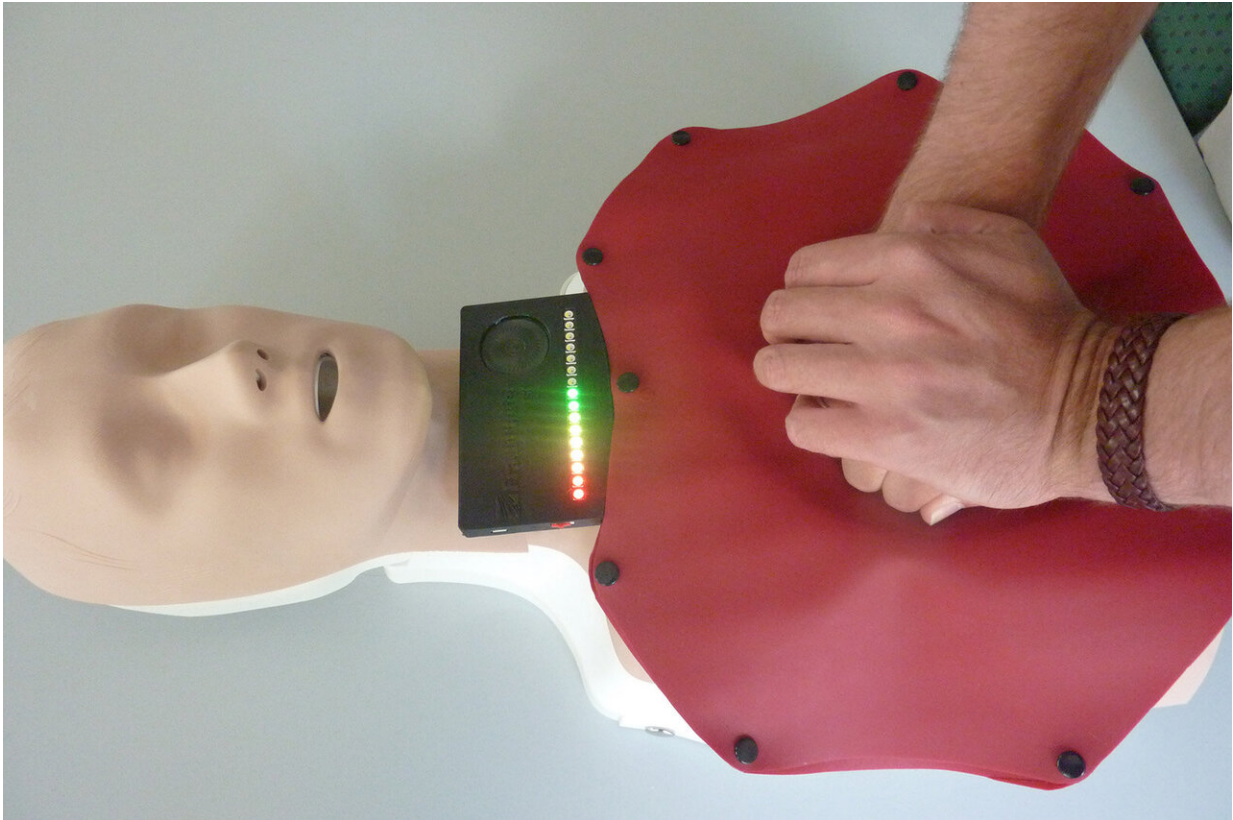


Resuscitation mat simplifies cardiac massage

August 2 2019, by Marie-Luise Righi



Illuminated LEDs at the upper edge of the mat indicate whether the first responder is administering chest compressions correctly. Credit: © Fraunhofer ISC

Every year, some 10,000 people in Germany die from cardiac arrest, even though they could have been saved. In fact, only 15 percent of Germans say they would trust themselves to administer cardiac massage

in an emergency situation. Now, an innovative new resuscitation mat is set to help inexperienced first responders resuscitate victims in cases of circulatory arrest. Equipped with integrated sensors, the first aid tool was developed by a team of Fraunhofer researchers in collaboration with students at the University of Applied Sciences in Munich.

On Munich's main square, shops are about to close up for the day when suddenly a person collapses unconscious to the ground, no longer breathing. The victim has suffered an acute cardiac arrest, to which there can be only one correct response: begin with chest compressions right away. With cardiac arrests, every minute counts. And yet, according to statistics from the German Society of Anaesthesiology, only 15 percent of Germans consider themselves able to administer the basic gestures needed to save the person's life.

"People are scared of making a mistake, and as a result either do nothing or administer the chest compressions too gently to be effective," says Dr. Holger Böse, Scientific and Technical Manager of the Fraunhofer Institute for Silicate Research ISC's Smart Materials Center in Würzburg. With Rescue Aid, an innovative new resuscitation mat, the physicist hopes to relieve first-aiders of their anxiety in stepping in. "If performed correctly, chest compressions significantly improve the victim's chances of survival. Rescue Aid is a way to simplify the resuscitation process," says Dr. Böse. The mat also eliminates direct bodily contact, reducing people's inhibitions and easing their reluctance to intervene. The silicone mat was developed as part of Fraunhofer's design competition, "Form follows future," which combines elements of science and design. It was designed by students at the University of Applied Sciences in Munich with the support of the SYN foundation.

Deformation sensors to measure compression depth

Shaped to resemble the human torso, the mat is first placed over the

upper body. Silicone deformation sensors integrated in the mat in a star pattern then measure the depth of compression. "Pressure from the first responder's hand deforms the sensors, allowing them to track the progress of the compressions," explains Böse.

The sensors are connected via cable to an electronics system in a box at the upper edge of the mat, with LEDs to show whether sufficient pressure is being applied. When the pressure is sufficient, green LEDs will light up. "The greater the pressure, the more LEDs light up. An array of red LEDs signals that the pressure was too much. The LEDs are controlled by the electronic system," explains the researcher. This allows the first responder to continuously monitor the pressure being applied, and make adjustments as necessary. An acoustic signal serves as a metronome, dictating the pace of the compressions, with the tone generator also housed in the electronics box.

Tests carried out on a resuscitation training dummy have already proven Rescue Aid's effectiveness. The mat is available as a demonstrator, and shall now be optimized and adapted to fit different body sizes.

Because the sensors are made of soft foil, they do not cause any injuries—a distinct advantage over the few competitor products on the market, which are rigid and cause pain in the palms of the hand during resuscitation. This is consistent with the experience of the paramedics interviewed in the course of the project.

With its technical approach and simple electronics, the [resuscitation](#) mat is cost-efficient to manufacture. "We could well imagine the Rescue Aid being a standard component of any first aid kit in the future," says Böse.

Provided by Fraunhofer-Gesellschaft

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