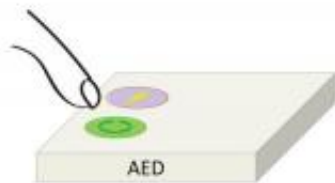


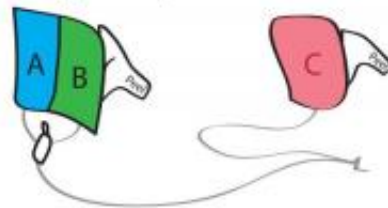
Unique AED pads give hearts a second chance

April 26 2011

1. Turn on AED.



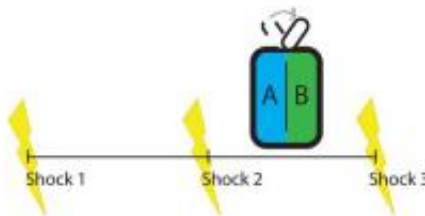
2. Peel backings from pads.



3. Apply pads to patients.



4. Flip switch from A to B after 2 shocks.



An invention by Rice University bioengineering students in collaboration with the Texas Heart Institute (THI) is geared toward giving immediate second chances to arrhythmia victims headed toward cardiac arrest.

For their capstone design project, a team of Rice seniors created a unique pad system for automated external defibrillators (AEDs), common devices that can shock a victim's heart back into a proper rhythm in an emergency.

Often, the first shock doesn't reset a heart and the procedure must be repeated, but the sticky pads on the chest must first be repositioned. The pads need to be in the right location to send current through the heart, and someone with no experience who tries to provide aid might miss the first time.

The Second-Chance AED Pads let rescuers try again without losing valuable time to remove the pads from the victim's chest. The pads incorporate three electrodes, two in a single pad with an A/B switch attached, and a third in its own pad.

If one shock doesn't restart the patient's heart, flipping the switch will change the jolt's path, just a little bit, for the second attempt.

The pads were developed by students on the DefibTaskForce -- Lisa Jiang, Joanna Nathan, Justin Lin, Carl Nelson and Brad Otto -- in tandem with Mehdi Razavi, director of electrophysiology clinical research at THI, and their adviser, Renata Ramos, a Rice lecturer in bioengineering.

The potential for their project was clear from the beginning. "We did some calculations that suggested we could save at least 13,000 lives per year," Otto said. "Cardiac defibrillation is very time-sensitive. Thirty seconds can be the difference between life and death in a lot of situations. The time it takes to flip the switch is negligible compared with the time it takes to remove the pads, shave and prep a new area on the body, reapply the pads and administer another shock. And a layman might not even know to try a second position."

Rather than try to build a new type of AED, the team decided early on that it was enough to simply design new pads that would fit devices that are already in use. Manufacturers generally require AED pads be replaced every two years, which provides a ready market for the students' invention. "But well over 100,000 AED units are produced

every year, so even if our pads are only paired with new AEDs, we have a significant market," Lin said.

Getting the instructions right turned out to be just as important as the device itself and required a lot of illustrative trial and error. In tests for the final version at Rice's Oshman Engineering Design Kitchen, the team recruited students with no experience using an AED to shock a medical mannequin back to life. "We had 100 percent of the testers place the pads correctly, showing it was very intuitive to use," Jiang said.

All five team members, along with Razavi and Ramos, are listed on the provisional patent. They hope an AED manufacturer will pick up the rights to the Second-Chance pads for clinical trials and ultimately FDA approval.

Provided by Rice University

Citation: Unique AED pads give hearts a second chance (2011, April 26) retrieved 16 July 2024 from <https://medicalxpress.com/news/2011-04-unique-aed-pads-hearts-chance.html>

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