CPR Advisor™ Revolutionary ICG Technology

Overview

CPR Advisor™ for the HeartSine® samaritan PAD automated external defibrillator provides real-time visible and audible feedback to the rescuer on the quality of compressions during a Sudden Cardiac Arrest (SCA).

Because Cardiopulmonary Resuscitation, commonly known as CPR, is crucial to deliver oxygenated blood to the body's vital organs, CPR Advisor ensures the rescuer performs effective CPR in line with the AHA and ERC guidelines.

To measure the quality of compressions, alternative AED solutions require a third sensor (or puck) to be placed on the patient's chest. While this sensor may effectively measure rate, the corresponding depth of compression measurement does not reflect patient physiology or account for the firmness of the surface on which the patient is lying. The use of a puck also is a source of significant discomfort to both rescuer and patient.

With its revolutionary technology HeartSine's patented CPR Advisor uses only the defibrillator electrodes to detect changes in patient impedance, in real time. These changes in impedance are related to the rate and force of compressions and correlate to a number of vital signs, including End Tidal CO_2 .
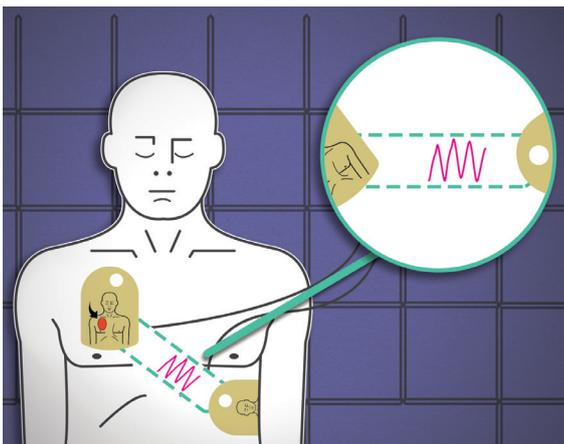

Figure 1. HeartSine's defibrillator detects changes in patient impedance.

How CPR Advisor Works

When a patient collapses and a rescuer performs CPR, the compressions applied by the rescuer cause the patient's chest to change shape. This change in shape results in an increase in the patient's chest impedance, or electrical resistance.

CPR Advisor captures this change in an ICG (impedance cardiography) waveform to count the number of compressions a rescuer administers and identify the force at which compressions are applied. CPR Advisor determines the compression rate by counting deflections in the ICG waveform and advises the rescuer to push faster if the compression rate is not within the AHA and ERC guidelines of 100-120 bpm.
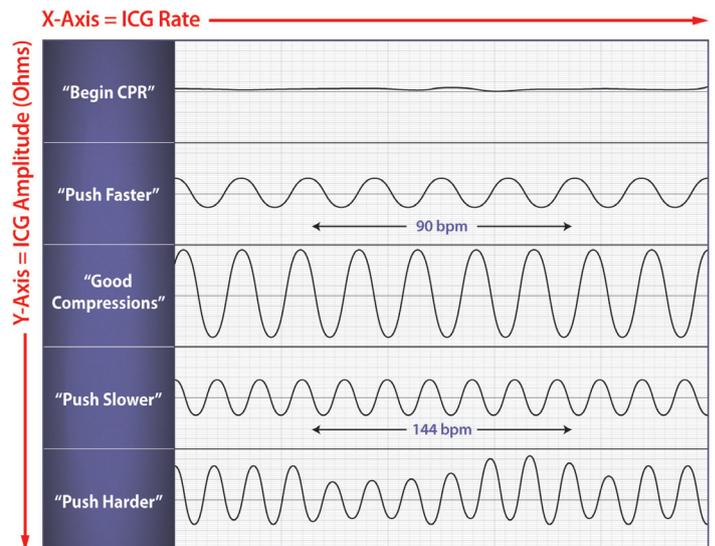

Figure 2. CPR Advisor determines compression force and rate to advise rescuer.

Lifesaving, **Pure and Simple**

When the rescuer compresses the patient's chest, the force is reflected on the ICG waveform. The greater the force, the greater the deflection. CPR Advisor™ measures the change in impedance and uses this to determine the appropriate feedback to the rescuer; advising the rescuer to push harder or acknowledging good compressions. The feedback to the rescuer is provided via visual indicators and audible voice prompts.
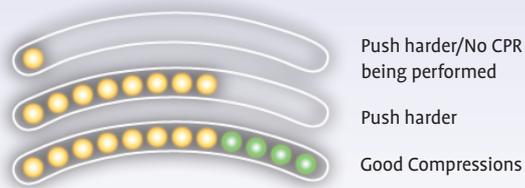
Push harder/No CPR being performed

Push harder

Good Compressions

Figure 3. Visual indicators let the user know if effective CPR is being administered.

Push Faster
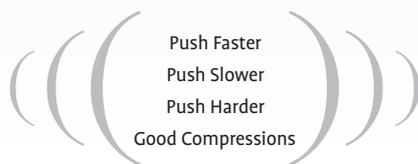Push Slower
Push Harder
Good Compressions

Figure 4. Voice prompts let the user know if chest compressions are being given correctly. Aural "clicks" help the user keep time.

The industry standard for measuring efficacy, or effectiveness, of CPR is End Tidal CO_2; that is, measuring the amount of Carbon Dioxide exhaled by the patient. CPR Advisor has been demonstrated to correlate very well with the End Tidal CO_2 measurement, as well as other vital signs, demonstrating that this technology is an excellent indicator of CPR efficacy [1-5].

Improved CPR Efficacy

With its real time visible and audible feedback to a rescuer, HeartSine's CPR Advisor significantly improves the efficacy of CPR. And because CPR Advisor is integrated within industry-leading HeartSine® defibrillators, a shock can be delivered if needed. Effective CPR, provided alone or in conjunction with a lifesaving shock, can dramatically increase the chance of survival.

As the samaritan® PAD is a defibrillator specifically designed for public access, all HeartSine defibrillators can be used with minimal training in any environment. Integrated CPR Advisor improves the efficacy of CPR while instilling more confidence in the rescuer—both of which lead to improved survival rates across the globe.

References

1. Di Maio R, O'Hare P, McAllister A, et al. The correlation between the impedance cardiogram and end-tidal carbon dioxide during cardiopulmonary resuscitation in a porcine model of cardiac arrest, Resuscitation 2014; 85: 1: S6

2. Di Maio R, Howe A, McCanny P, et al. Is the impedance cardiogram a potential indicator of effective external cardiac massage in a human model? A study to establish if there is a linear correlation between the impedance cardiogram and depth in a cardiac arrest setting. Resuscitation, 2012; 83: 62.

3. Di Maio R. The impedance cardiogram is an indicator of CPR effectiveness for out-of-hospital cardiac arrest victims. J Am Coll Cardiol 2010; 55. A217.E2062.22

4. Brody D, Di Maio R, Crawford P, et al. The impedance cardiogram amplitude as an indicator of cardiopulmonary resuscitation efficacy in a porcine model of cardiac arrest. J Am Coll Cardiol 2011;57:E1134

5. Cromie NA, Allen JD, Navarro C, et al. Assessment of the impedance cardiogram recorded by an automated external defibrillator during clinical cardiac arrest. Crit Care Med, 2010; 38(2): 510-7

CE 0120 The products described in this brochure all meet the applicable European Medical Directive requirements.

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Lifesaving, **Pure and Simple**

HeartSine®
Inventor. Innovator. Lifesaver.

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