The goal of using LUCAS is to provide effective, consistent, and uninterrupted chest compressions. When an interruption to chest compressions occurs, the patient’s coronary perfusion pressure (CPP) drops rapidly. Coronary perfusion pressure is the measure of the pressure that drives blood flow through the coronary arteries to the heart muscle. The heart normally maintains a CPP of 60 millimeters of mercury (mmHg) or more. During cardiac arrest, the CPP drops dramatically, threatening the heart muscle’s blood supply. As it can take some time to buildup CPP again, interruptions to chest compressions should be minimized.1

Defibrillation During LUCAS Use

Defibrillation can be performed during LUCAS operation. Use the defibrillator, in manual or AED mode, according to the defibrillator manufacturer’s instructions and agency protocols, and according to the recommendations below.

Pad Placement

Self-adhesive defibrillation pads should be used as these make it easier to work with LUCAS. Position the defibrillator pads and wires so they are not under the suction cup. If pads are applied after LUCAS is in place, orient the pads in a way so the pads and wires are not under the suction cup (see photo below). If pads are already on the patient, consider applying new ones to avoid placement under the suction cup.

Rhythm Analysis

Pause LUCAS during a rhythm check with a manual defibrillator or analysis with an AED. Compressions can interfere with the ability of the rescuer or defibrillator algorithm to analyze the ECG. Make the interruption as short as possible to minimize interrupting compressions. Resume compressions as soon as feasible.

After Defibrillation

After the shock is delivered it is important to verify the position of the suction cup to see it has not moved out of place. This is easier to do if an ink marker line was drawn when LUCAS was originally positioned on the patient. Readjust as necessary.

Oxygenation with Ventilation

To supply adequate concentrations of oxygen in the blood, ensure the patient is properly ventilated. Ventilations should be provided in conjunction with mechanical chest compressions. Interruptions to chest compressions should be minimized to maintain the level of oxygen delivered to tissues. During the first few minutes of sudden cardiac arrest, chest compressions to improve blood flow have been shown to be more important than ventilations because oxygen blood levels remain high initially.3

The optimal method of managing the airway during cardiac arrest will vary depending on the provider experience, emergency medical services (EMS) or healthcare system characteristics, and the patient’s condition.

Non-secured Airway (e.g., bag-valve-mask):

Stop chest compressions during delivery of ventilations. The ERC Guidelines recommend a compression/ventilation ratio of 30:2, providing rescue breaths over 1 second each, with enough volume to produce visible chest rise.4

- LUCAS 2: Press ACTIVE (30:2) and LUCAS will perform 30 compressions and then temporarily stop for 3 seconds to allow for two ventilations to take place. An intermittent LED in combination with an audio signal sequence will alert the operator before each ventilation pause.
- LUCAS 1: Turn the operation knob to LOCK after 30 compressions to pause the device and deliver two ventilations. Turn the operation knob to ACTIVE to resume compressions.
Secured airway (e.g., endotracheal tube):
Ventilation and chest compressions do not need to be synchronized and ventilations can be provided without pausing for compressions. The ERC guidelines recommend 10 ventilations per minute and limited tidal volume to achieve chest rise. Avoid rapid or forceful breaths.4,5 Follow your protocols regarding ventilations for patients with a secured airway in place.

- LUCAS 2: Press **ACTIVE (continuous)** to provide continuous compressions. A green LED blinks 8 times per minute to alert the rescuer for ventilation.
- LUCAS 1: Provides continuous compressions

**Alternative airways**
Airways like Laryngeal Mask Airways (e.g., LMA™), LMA ProSeal™, Laryngeal Tube from VBM Medical, esophageal-tracheal tube (e.g., Combitube™) require caution during use with mechanical compressions due to limited clinical data. If gas leakage causes inadequate ventilation of the patient’s lungs during continuous compressions, pause compressions to enable ventilation in the same way as for non-secured airways (switch to 30:2).5

**Mechanical ventilators**
Most mechanical ventilators have not been designed to manage the great variations in pressure that occur in the thorax during external chest compressions. Take caution if using mechanical ventilators together with manual as well as mechanical CPR.

**Impedance threshold devices (e.g., ResQPOD®)**
Experimental data suggest that the Impedance Threshold Device (ITD) is compatible for use with LUCAS chest compressions.6 Refer to the ITD manufacturer’s instructions for use, indications, contraindications, warnings, precautions, and potential adverse events.

**General precaution**
The use of other medical equipment or drugs in conjunction with LUCAS can affect the treatment. Always consult the Instructions for Use for the other equipment and/or drugs to make sure that they are appropriate for use in conjunction with CPR.

References:

NOTE: Before using the LUCAS Chest Compression System, become familiar with the components and symbols on the device. Refer to the LUCAS Instructions for Use for complete directions for use, indications, contraindications, warnings, precautions and potential adverse events. Manual compressions can alternatively be provided to the patient to support circulation. Please refer to your medical protocols for instructions on ventilating and defibrillating a patient as part of the overall medical care required to resuscitate a cardiac arrest patient. All patients treated with LUCAS should receive assistance with ventilation.