

# LUCAS 2® Mechanical Chest Compression Device

## Skills to be achieved:

- Explain the rationale for using the LUCAS 2 Device
- Be able to demonstrate appropriate placement, operation, and troubleshooting of the LUCAS 2 Device

## Theoretical knowledge to be covered:

- Indications for use
- Contra-indications
- Anatomy of the device
- How to use the device

## Answer the following questions:

- What is the LUCAS 2 Device?
- When should the LUCAS 2 Device be used?
- How does the LUCAS 2 Device work?
- How do you adjust the suction cup/plunger placement?
- How do you check the battery level?
- How do you change the battery?
- Which parts are disposable and how do you clean the device?

## What is the LUCAS 2 Mechanical Chest Compression Device?

The Lucas 2 Device is designed to provide effective and consistent automated external chest compressions to patients over the age of 12 suffering from non traumatic cardiac arrest.

## When should the LUCAS 2 be used?

For inclusion within the 2Cheer study, the LUCAS 2 Device should be used where manual chest compressions would otherwise be used, AND if:

- age under 12-70yr

AND meets ALL of the following criteria:

- the cardiac arrest is likely to be of primary cardiac or respiratory cause
- the cardiac arrest was witnessed by a bystander or paramedic or hospital staff member
- chest compressions commenced within 10 minutes
- initial cardiac rhythm of ventricular fibrillation (VF)
- immediate availability of a mechanical CPR device with paramedic staff
- the cardiac arrest duration (collapse to arrival at ED) has been < 60minutes

OR meets ONE of the following criteria:

- Severe hypothermia (<32°C) due to accidental exposure
- Severe overdose with  $\beta$ -blockers, tricyclic antidepressants, digoxin or other agents causing profound reversible myocardial depression and/or cardiac rhythm disturbance
- Any other cause where there is likely to be reversibility of the cardiac arrest if an artificial circulation can be provided (e.g. massive pulmonary embolism)

### Exclusion criteria

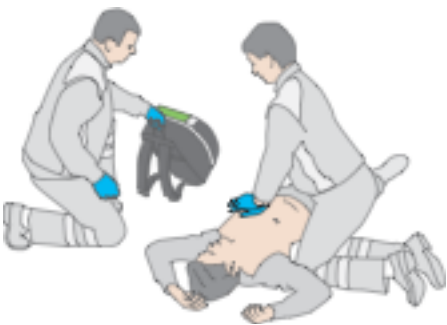
- Active bleeding
- Known wish of the patient not to receive extraordinary or invasive life prolonging medical intervention
- Known pre-existing comorbidity and/or functional limitations that would prevent a future return to independent life

### How does the LUCAS 2 Device work?

The LUCAS 2 Device provides automated chest compressions at a rate of 100 per minute, to a depth of 4-5cm, and weighs 7.8 kg (with battery). It has an equal compression/decompression time, and has an average battery operation time of 45 minutes. It has two ACTIVE modes of operation, a continuous mode and a 30:2 mode ( which pauses compressions for BVM ventilation). **We will NOT be using the 30:2 mode.**

### Using the LUCAS 2 Device

1) Minimise Interruptions to Manual CPR at all times.



2) Confirm inclusion criteria for START Project

3) **Activate (A)** the mechanical CPR device, by pushing the “ON/OFF” button for one full second for the self test and device start up procedure.



- 4) Remove the **Backboard (B)** and place it under the patient's back just below the axillae level, to permit the plunger to be placed at the lower half of the sternum.

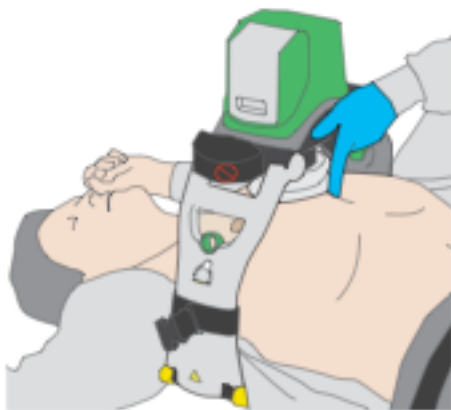



- 5) Remove the **Compression (C)** device from the bag, pulling the release pins (opening the attachment claws) and then attach the device to backboard, listening for the “click” of attachment, and pulling up to ensure secure attachment.



- 6) Position the suction cup over the chest, using two fingers, and with the device in the “adjust mode” (button 1).

The suction cups inferior rim should be one finger breadth above the xiphisternum. For proper **Depth (D)** of compressions, the hard plunger (inside the suction cup) must touch the sternum.



- 7) Press the pause button (button 2)  to confirm the plunger position, and remove the fingers from the suction/plunger area.



- 8) **Engage (E)** compressions by pressing the active button (button 3) ensuring the suction cup and plunger position is appropriate.
- 9) You should mark the plunger position for easy identification of displacement of the plunger that may occur during defibrillation, procedures, or moving of the patient.
- 10) **Follow-on (F)** procedures, such as airway management, IV access, defibrillation, placement of the LUCAS 2 neck strap (to help prevent movement of the device on the patient), securing of the patients hands with the wrist straps, and transport of the patient can all occur with the LUCAS 2 device in operation.



- 11) A reminder that defibrillation pads will need to be moved or replaced if they are in contact with the suction cup/plunger.
- 12) If you need to adjust the plunger position, press the pause button (button 2), then the adjust button (button 1).

## Changing the Battery

To change the battery whilst the device is in use:

- 1) Press the pause button (button 2) to stop the compressions, then pull the battery upwards and out to remove.



- 2) Replace with a fully charged battery from the pack.

- 3) Push the Active mode (button 3) to resume compressions.
- 4) If it takes more than 60 seconds to change the battery, the device will need to do another self test, and you must go through the device positioning procedure once again.

### **Cleaning and disposing of single use parts**

- 1) The suction cup should be disposed of after each use.



- 2) The LUCAS 2 device should not be immersed in water. The device, backboard and straps can be cleaned by wiping down with a mild soap or disinfectant solution.

### **Start of Shift checks**

- 1) A battery check can be performed by holding the MUTE button.



- 2) You should also check that all the parts, straps and spare battery are in the pack.

# LUCAS<sup>TM</sup> 2 Quick Reference Guide

## Chest Compression System

**NOTE:** This guide is not a complete Instructions for Use. Refer to the "Instructions for Use" for complete directions for use, indications, contraindications, warnings, precautions, and potential adverse events.



ON/OFF



ADJUST



PAUSE



ACTIVE  
continuous



ACTIVE  
30:2

Confirm cardiac arrest and start manual CPR with a minimum of interruptions until LUCAS is applied and ready.



### 1 Activate (A)

- Push **ON/OFF** for 1 second to start self-test and power up LUCAS



### 2 Back Plate (B)

- Pause manual CPR
- Carefully put Back Plate under the patient, below armpits
- Resume manual CPR



### 3 Compressor (C)

- Pull release rings once; claw locks open. Then let go of the release rings
- Attach to Back Plate; listen for "click"
- Pull up once to ensure attachment



### 4 Position the Suction Cup

- Center the Suction Cup over the chest
- The lower edge of Suction Cup should be immediately above the end of the sternum

### 5 Push down the Suction Cup

- Push the Suction Cup down with two fingers (make sure it is in the **ADJUST** mode)
- Pressure pad inside Suction Cup should touch patient's chest. If the pad does not touch or fit properly, continue manual compressions
- Push **PAUSE** to lock Start Position – then remove your fingers from the Suction Cup



### 6 Start compressions

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### 7 LUCAS Stabilization Strap

- Attach the LUCAS Stabilization Strap



Always follow local and/or international guidelines for CPR when you use LUCAS.

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