

LUCAS[®] 3, v3.1

chest compression system

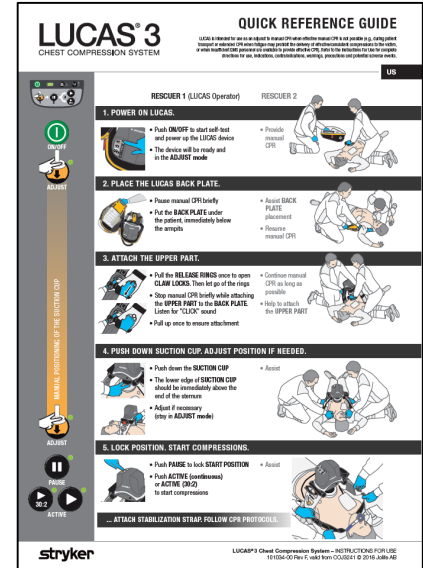
Orientation guide



Important user information

All operators must read the complete Instructions for Use before operating the LUCAS chest compression system.

This PowerPoint does not replace the Instructions for Use document.



LUCAS chest compression system

- Effective, consistent, and continuous chest compressions as recommended in the American Heart Association guidelines and the European Resuscitation Council guidelines
- LUCAS can be used in a wide variety of situations and settings: on the scene, during patient movement, during transportation in road and air ambulances, hospitals, and catheterization laboratories



AHA/ERC Guidelines 2015

- Minimize pauses in chest compressions
- Depth 2.0-2.4 inches
- Rate 100-120 per min
- Full chest recoil
- Avoid excessive ventilation (30:2 or 10 per min)



Important user information

Setup options LUCAS 3, v3.1

The LUCAS factory default settings are consistent with 2015 American Heart Association (AHA) and European Resuscitation Council (ERC) guidelines. Setup options should be **changed only under the direction of a physician** knowledgeable in cardiopulmonary resuscitation who is familiar with the literature in this area.

- The setup options are **optional**
- If NOT applied, the device will operate according to its **factory default settings, which are identical** to LUCAS 3, v3.0 and LUCAS 2, v2.2
- The training, application steps, and user interface remains the same as LUCAS 3 and LUCAS 2 devices

Intended use

Adult patients with acute circulatory arrest:

- Absence of spontaneous breathing
- Absence of pulse
- Loss of consciousness

LUCAS must only be used in cases where chest compressions are likely to help the patient.

The LUCAS device is intended for use as an adjunct to manual CPR when effective manual CPR is not possible (e.g., during patient transport, extended CPR, fatigue, insufficient personnel).



Contraindications

Do **not** use the LUCAS chest compression system in these cases:

- If it is not possible to position the LUCAS device safely or correctly on the patient's chest
- Too small patient
 - If LUCAS alerts with 3 fast signals when lowering the suction cup and you cannot enter the PAUSE mode or ACTIVE mode
- Too large patient
 - If you cannot lock the LUCAS upper part to back plate without compressing the patient's chest

Always follow local and/or international guidelines for CPR when you use the LUCAS chest compression system.

Side effects

The International Liaison Committee on Resuscitation (ILCOR) states these side effects of CPR¹:

“Rib fractures and other injuries are common but acceptable consequences of CPR given the alternative of death from cardiac arrest. After resuscitation, all patients should be reassessed and reevaluated for resuscitation-related injuries.”

Apart from the above, skin abrasions, bruising, and soreness of the chest are common during the use of the LUCAS chest compression system.

1. 2005 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations, *Resuscitation* 2005;67:195



Patient parameters

- Sternum height of 6.7 to 11.9 inches
 - Too small patient - If LUCAS alerts with 3 fast signals when lowering the suction cup and you cannot enter the PAUSE mode or ACTIVE mode
- A maximum chest width of 17.7 inches
 - Too large patient - If you cannot lock the LUCAS upper part to back plate without compressing the patient's chest

The use of the LUCAS device is not restricted by patient weight.

LUCAS fits large patients

Weight:

180 lbs

Height:

6 ft



Weight:

330 lbs

Height:

6 ft, 5 in



Weight:

320 lbs

Height:

5 ft, 10 in



LUCAS chest compression system

- 98% of patients fit in the LUCAS device in North American study¹
- 95% of patients fit in the LUCAS device in large RCT LINC trial (Europe)²

Using the LUCAS device is **not** restricted by patient weight.



Weight:
180 lbs

Height:
6ft

1. Brodal Syversen K, Souvannasacd E, Renger R. Validating the LUCAS mechanical chest compression fit specifications. The American Journal of Emergency Medicine, Volume 37, Issue 2, February 2019, Pages 371-373.

2. Rubertsson S, Lindgren E, Smekal D, et al. Mechanical chest compressions and simultaneous defibrillation vs conventional cardiopulmonary resuscitation in out-of-hospital cardiac arrest: The LINC Randomized Trial. JAMA. 2014;311:53-6.

Main components

The main parts of the LUCAS chest compression system include:

- An upper part which contains the proprietary and rechargeable LUCAS battery and the compression mechanism with the disposable suction cup
- A stabilization strap which helps secure the position of the device in relation to the patient
- A back plate which is positioned underneath the patient as a support for the external chest compressions
- A carrying case



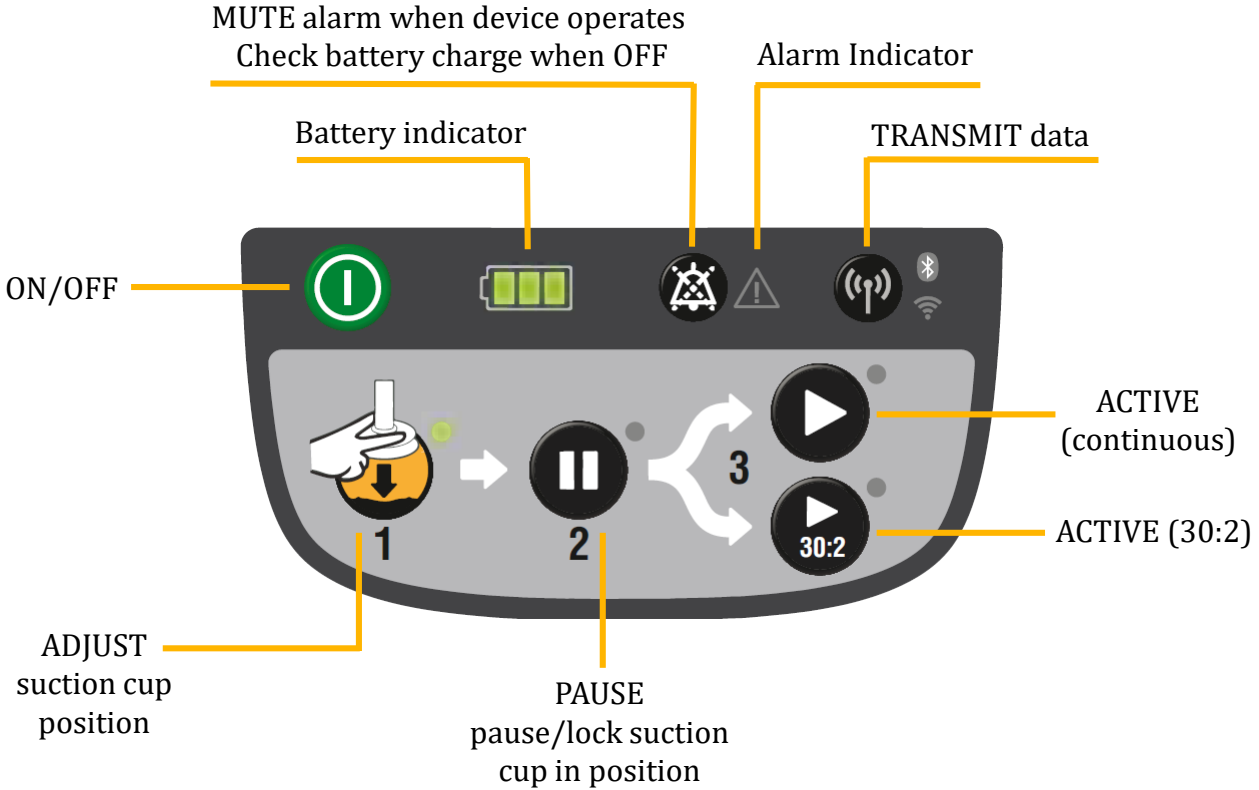
Device components

- | | |
|--|------------------------------|
| 1. Hood | 12. Back plate* |
| 2. User control panel | 13. Claw locks |
| 3. Battery | 14. Car Power cable |
| 4. DC input | 15. Power supply cord |
| 5. Bellows | 16. Power supply |
| 6. Suction cup* | 17. External battery charger |
| 7. Patient wrist strap* | 18. Carrying case |
| 8. Release ring | 19. Charger port access |
| 9. Support leg | 20. Transparent top window |
| 10. Support leg strap
(part of the Stabilization Strap) | 21. Upper part |
| 11. Neck strap*
(part of the Stabilization Strap) | 22. Pressure pad* |
| | 23. Vent holes |



*Applied part (according to IEC 60601-1)

User interface



- Fully charged
- 2/3 charged
- 1/3 charged
- Low battery: approx. 10 minutes of operating capacity remain
- Battery charge too low/ Battery overheat
- End of battery service life
- High priority alarm

Power

Lithium-ion polymer battery (rechargeable)

Capacity: 3300mAh (typical), 86 Wh

Battery runtime: 45 minutes (typical)

Charge:

- External power supply
 - Input; 100-240VAC
 - Charge time in LUCAS device > 2 hrs
- External battery charger
 - Charge time > 4 hrs
- Car power cable
 - Voltage/current; 12-28VDC



Charge device in carrying case

Convenient battery charge access port

- ✓ Open up flap on back
- ✓ Connect LUCAS device to external power through case

Note: Pack LUCAS device with the DC input facing the case charge port



Power at a glance

Quickly check your battery charge status

Top window

Note: Position the LUCAS device in the right direction inside the bag (LUCAS DC input facing the case charge port)



Press MUTE to see charge level

- LUCAS device in OFF mode



Hard carrying case

- Light and compact
- Easy to clean
- Reflective sticker
- Big handholds
- Easy-to-open zipper
- Adjustable shoulder straps



Inside the hard carrying case



In the carrying case compartment between the LUCAS support legs, you may put optional accessories such as the external power supply, a charged spare LUCAS battery and extra suction cups.

LUCAS³ CHEST COMPRESSION SYSTEM

QUICK REFERENCE GUIDE

LUCAS³ is intended for use as an adjunct to manual CPR when effective manual CPR is not possible (e.g., during patient transport or inpatient CPR when respite may be needed for the provider). It does not replace manual CPR. Read the instructions for use for complete directions for use, indications, contraindications, warnings, precautions and possible adverse events.

US

	RESCUER 1 (LUCAS Operator)	RESCUER 2
1. POWER ON LUCAS.	<ul style="list-style-type: none"> Push ON/OFF to start self-test and power up the LUCAS device The device will be ready and in the ADJUST mode. 	<ul style="list-style-type: none"> Provide manual CPR
2. PLACE THE LUCAS BACK PLATE.	<ul style="list-style-type: none"> Pause manual CPR briefly Put the BACK PLATE under the patient, immediately below the armpits 	<ul style="list-style-type: none"> Assist BACK PLATE placement Resume manual CPR
3. ATTACH THE UPPER PART.	<ul style="list-style-type: none"> Pull the RELEASE RINGS once to open CLAW LOCKS. Then let go of the rings Step manual CPR briefly while attaching the UPPER PART to the BACK PLATE. Listen for "CLICK" sound Pull up once to ensure attachment 	<ul style="list-style-type: none"> Continue manual CPR as long as possible Help to attach the UPPER PART
4. PUSH DOWN SUCTION CUP. ADJUST POSITION IF NEEDED.	<ul style="list-style-type: none"> Push down the SUCTION CUP The lower edge of SUCTION CUP should be immediately above the end of the sternum Adjust if necessary (stay in ADJUST mode) 	<ul style="list-style-type: none"> Assist
5. LOCK POSITION, START COMPRESSIONS.	<ul style="list-style-type: none"> Push PAUSE to lock START POSITION Push ACTIVE (continuous) or ACTIVE (20-2) to start compressions 	<ul style="list-style-type: none"> Assist
ATTACH STABILIZATION STRAP FOLLOW CPR PROTOCOLS.		

LUCAS³ Chest Compression System – INSTRUCTIONS FOR USE
10/2024-20 Rev. F, valid from CUG241 © 2016, 2018, 2020, 2021, 2022, 2023, 2024

LUCAS in the cath lab

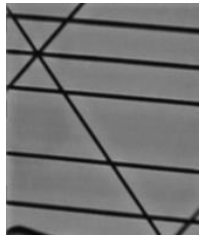
- LUCAS is mostly radiotranslucent, with the exception of the hood and piston, allowing for projections at multiple angles



Simulated drawing depicting radiotranslucency of LUCAS

Multiple back plate options

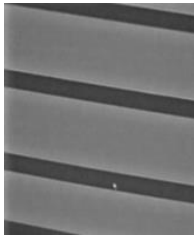
Allows for angiography during CPR



LUCAS 2 back plate



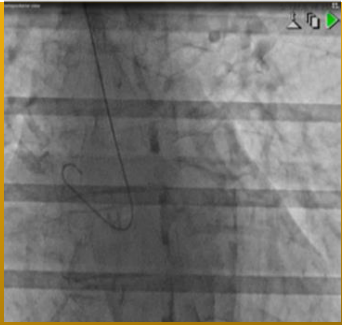
PCI back plate



LUCAS 3 back plate

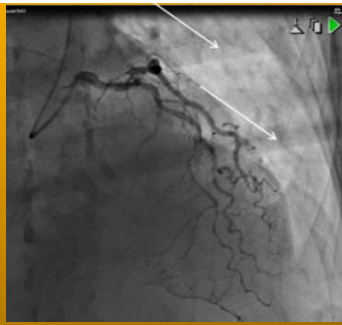
LUCAS 3 back plate AP view

Straight anterior-posterior view (no LUCAS upper part attached in cases of precautionary placement of back plate)

A diagram showing a patient lying on a back plate in an anterior-posterior (AP) view. The back plate is positioned over the patient's back, and the upper part is not attached.

LUCAS 3 back plate oblique view

Oblique views (required when LUCAS upper part is attached)

A diagram showing a patient lying on a back plate in an oblique view. The back plate is positioned over the patient's back, and the upper part is attached. The diagram is labeled with "CAUDAL" and "RAO -30°".

Optional: setup options

Configure LUCAS 3, v3.1 device behavior via your LUCAS account on LIFENET System



Compressions
(rate/depth)



Suction cup
(AutoFit, QuickFit, manual)



Ventilation
(number of prompts, pause duration, chest rise)



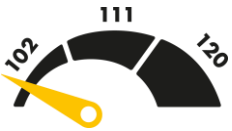
Timer
(continuous or CPR timer)



Transmit data
(send and receive data after the event)

Compressions rate and depth

Setup option LUCAS 3, v3.1



Preset a fixed rate
102 - 111 - 120/min



Preset various rates
102 - 111 - 120/min
(toggle ACTIVE key/s to change rate on the fly)



Preset fixed depth
1.8 - **2.1** inches

Demo

Changing rate from 102 to 120



Note: bold brown values are factory default settings

Suction cup start position

Setup option LUCAS 3, v3.1



QuickFit
(small adjustment of 1.2 inch span,
factory default setting)



AutoFit
(full automatic adjustment to the chest)



Manually
(no automatic adjustment at all)

Note: **bold brown** values are factory default settings

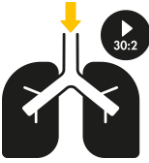
Demo AutoFit



Note: Training instructions remain the same; lower suction cup manually and look for correct position on chest

Ventilation during CPR

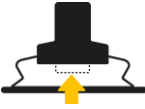
Setup option LUCAS 3, v3.1



Ventilation in 30:2 mode
 Ventilation pause from **3** up to 5 sec
 Ratios: **30:2** or 50:2



Ventilation in continuous mode
 Ventilation LED alerts from 6 to **10**/min
 Audible alerts **ON/OFF**
 Ventilation pause **0.3** – 1.5 sec



Allow for chest rise during ventilation (ON/OFF)
 Pressure pad release 10mm

- During PAUSE
- During ventilation pauses in ACTIVE modes
- At every compression in ACTIVE modes

Note: **bold brown** values are factory default settings

Demo

Audible ventilation alert in ACTIVE continuous mode 



Timers

Setup option LUCAS 3, v3.1



Timers (ON/OFF)

Audible alert e.g. every 2 minutes
Set up 1-15 min in 1 min increments

- CPR timer
(measures time only in ACTIVE modes)
- Continuous timer
(measures time independent of operation mode)

Demo

Audible timer alert in ACTIVE continuous mode



Note: **bold brown** values are factory default settings

Transmit data

Send and receive data after the event

LUCAS captures data of the device status and use, and can be configured to meet local protocols.

The data can be transmitted using Bluetooth® or Wi-Fi®.

Push the TRANSMIT data key to send device data and receive new configurations.

To transmit:

- ✓ Make sure the LUCAS device is powered OFF
- ✓ Push the TRANSMIT data key



Post-event reporting

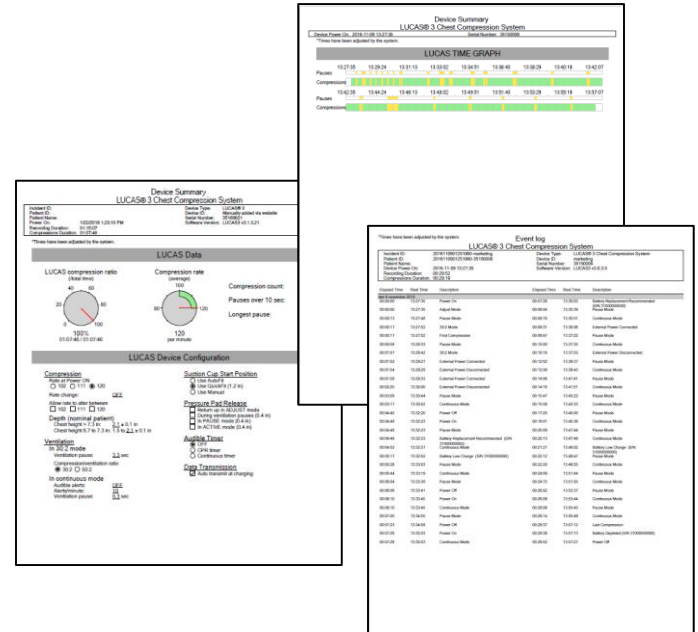
Send and receive data after the event



A post-event report (PDF) can be emailed to any predetermined email address(es).

The post-event report will be emailed if:

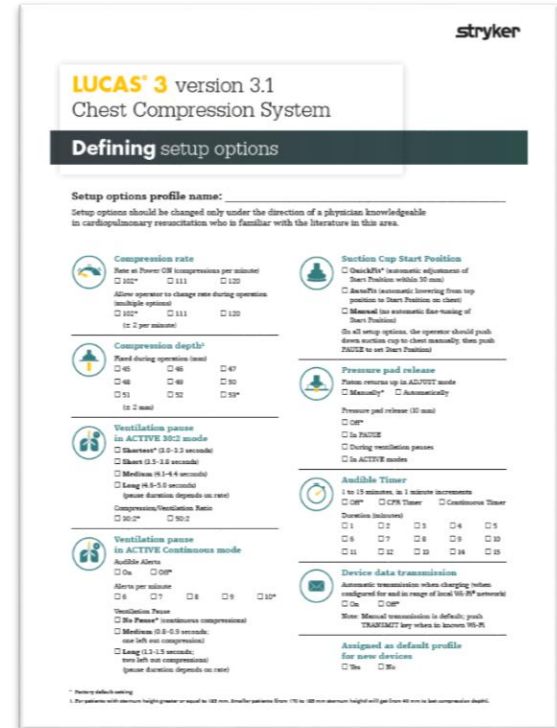
- LUCAS device is in range of a known Wi-Fi network
- The TRANSMIT key is pressed (LUCAS must be in power OFF mode)
 - Can be set up to occur automatically when device is idle and charging (optional opt-in)
- Device administrator email will automatically receive report; others have to be added



Defining setup options

Marketing material – GDR 3336793

- Marketing piece to support how to define setup on LUCAS device



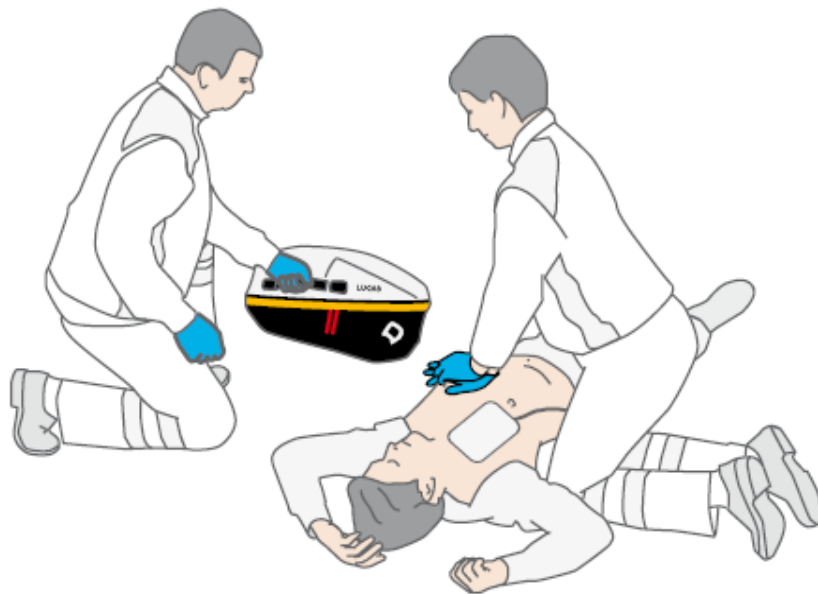
Basic
orientation,
use and
handling of
LUCAS



Arrival at the patient



- ✓ Immediately start manual CPR

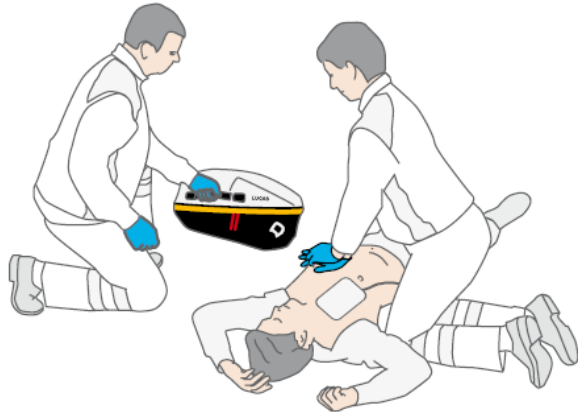
Uninterrupted high-quality CPR is related to good patient outcomes. Work in teams to minimize interruptions to manual CPR before and during LUCAS application.



1. Power On LUCAS

Rescuer 1 (LUCAS operator)

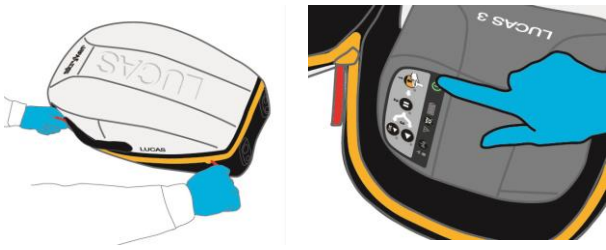
- ✓ Open the carrying case
- ✓ Push ON/OFF  to start self-test and power up the LUCAS device
- ✓ The device will be ready and in ADJUST mode 



Rescuer 2

- ✓ Provide manual CPR

Note: If you let the LUCAS device stay in ADJUST mode, it will power off automatically after 5 minutes. You may need to power ON the device again.



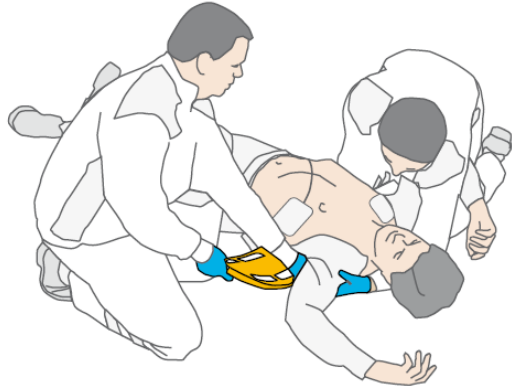
2. Place the back plate

Rescuer 1 (LUCAS operator)

- ✓ Pause manual CPR briefly
- ✓ Put the back plate under the patient, immediately below the armpits

Rescuer 2

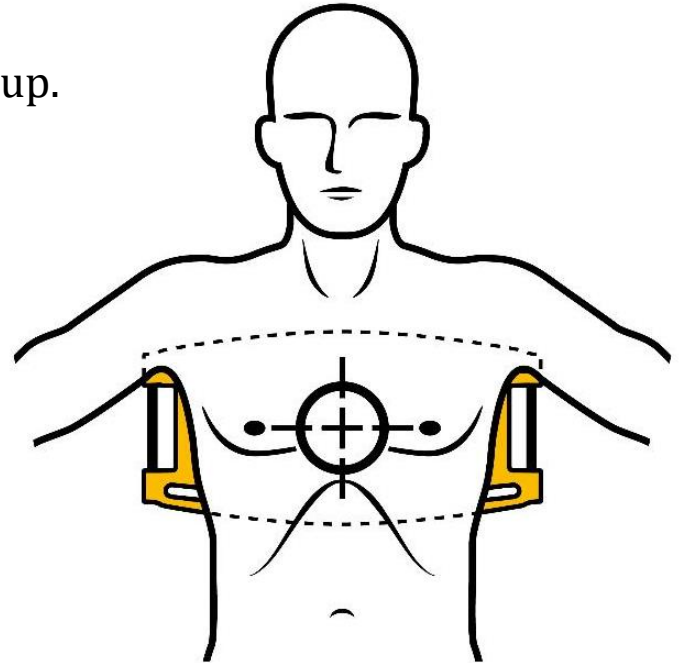
- ✓ Assist back plate placement
- ✓ Resume manual CPR



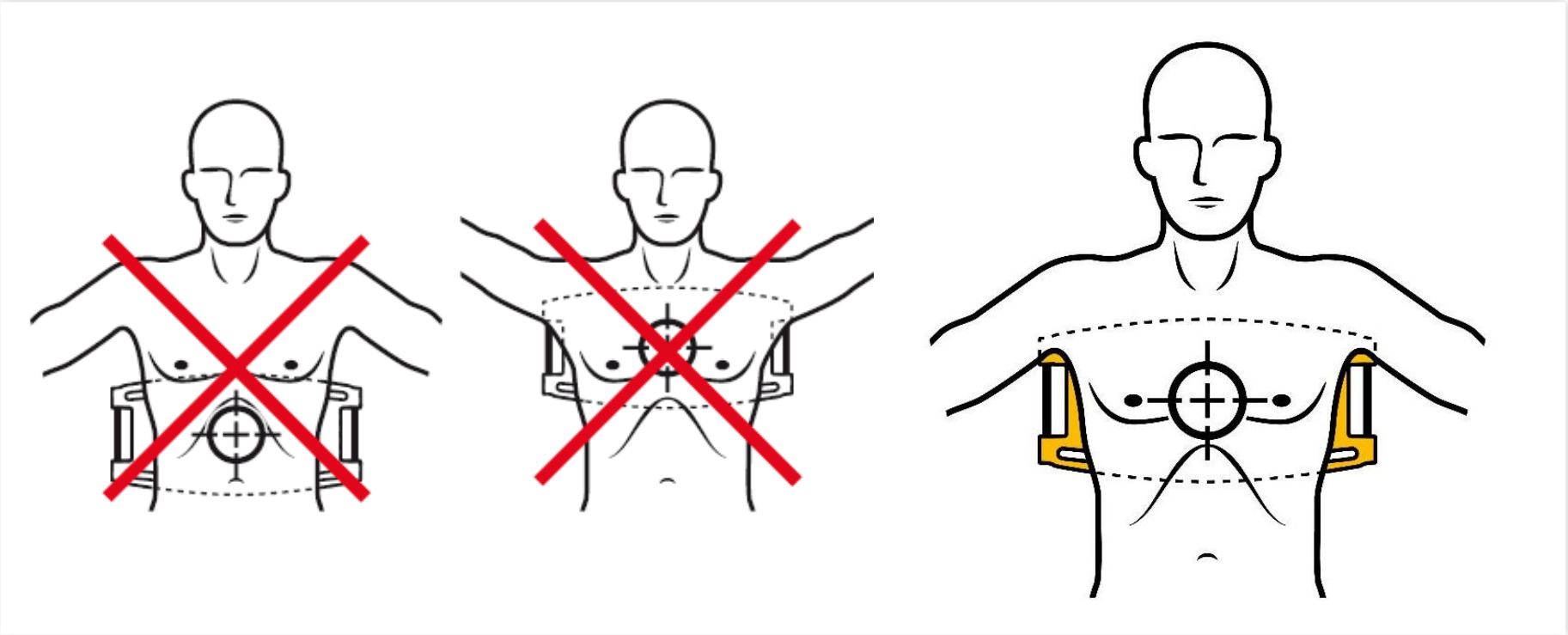
Position the back plate

Position the back plate correctly from the start.
This helps facilitate a correct position of the suction cup.

- ✓ Place patient's arms straight out (i.e. crucifix position)
- ✓ In large patients, move the patient's arms up towards the head to get adipose tissue out of the way
- ✓ Lift the patient's upper body a small distance or roll the patient from side to side when placing the back plate
- ✓ Coordinate the application to minimize interruptions to manual chest compressions



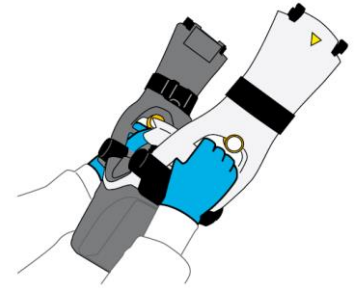
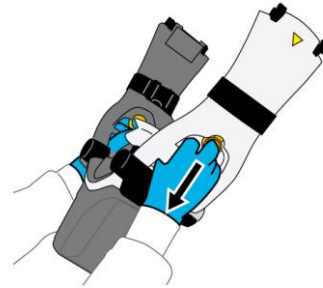
Position the back plate



3. Attach the upper part

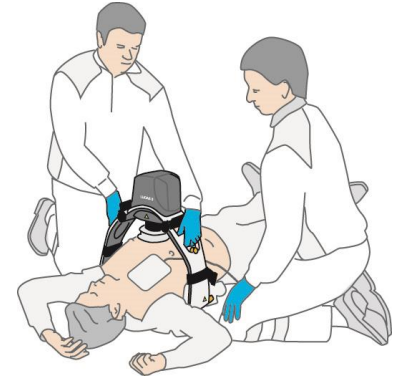
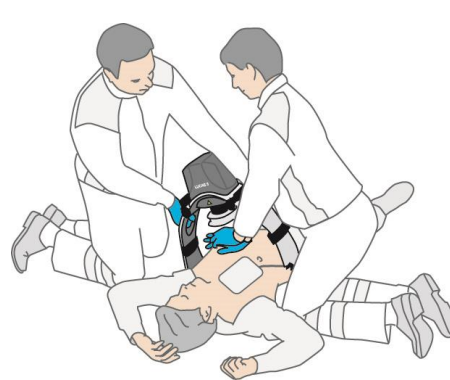
Rescuer 1 (LUCAS operator)

- ✓ Pull the release rings once to open claw locks, then let go of the rings
- ✓ Stop manual CPR briefly while attaching the upper part to the back plate. Listen for “click” sound
- ✓ Pull up once to ensure attachment



Rescuer 2

- ✓ Continue manual CPR as long as possible
- ✓ Help attach the upper part



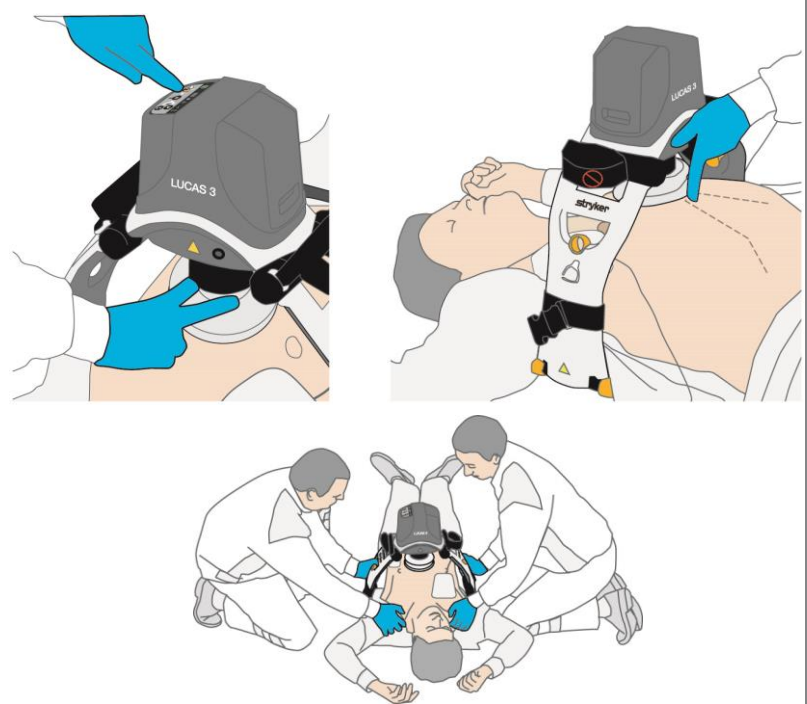
4. Push the suction cup down and adjust the position if needed

Rescuer 1 (LUCAS operator)

- ✓ Push down the suction cup
- ✓ The lower edge of suction cup should be immediately above the end of the sternum
- ✓ Adjust if necessary (stay in ADJUST mode)

Rescuer 2

- ✓ Assist



ON/OFF




ADJUST

MANUAL POSITIONING OF THE SUCTION CUP

ADJUST

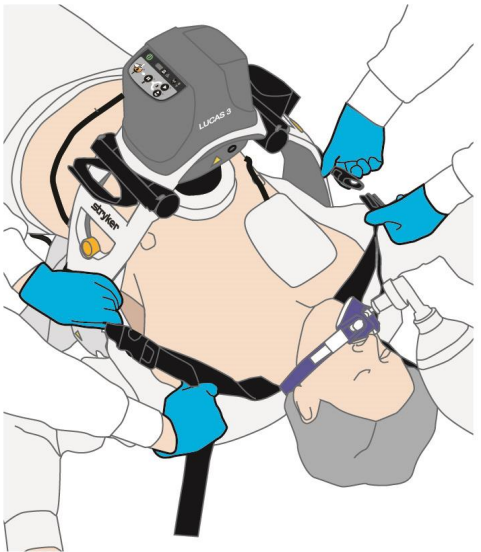
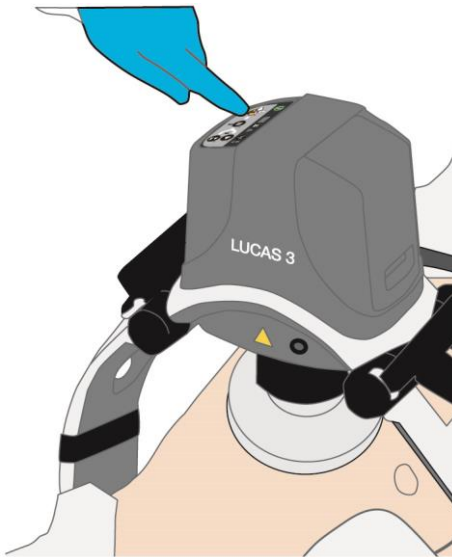
5. Lock position and start compressions

Rescuer 1 (LUCAS operator)

- ✓ Push PAUSE to lock start position 
- ✓ Push ACTIVE (continuous)  or ACTIVE (30:2)  to start compressions

Rescuer 2

- ✓ Assist



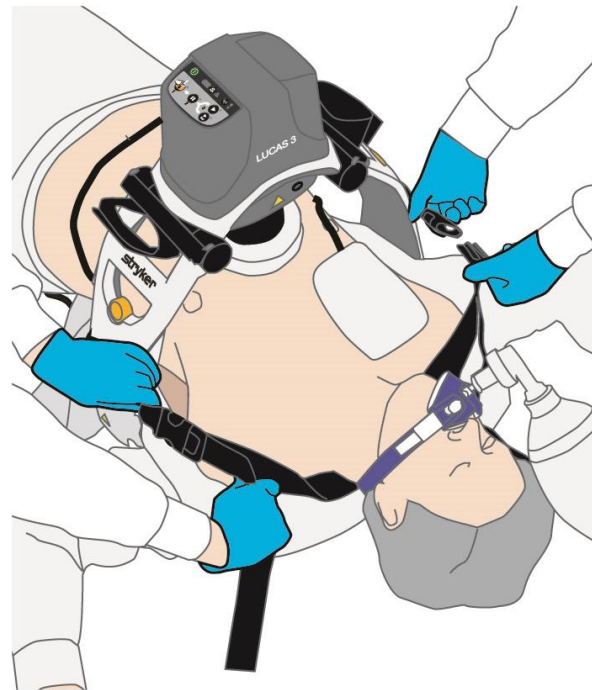
6. Apply stabilization strap

- ✓ Apply the stabilization strap
- ✓ Follow CPR protocols

LUCAS stabilization strap helps secure the correct position.

Make sure that LUCAS is positioned correctly on the patient's chest during the whole resuscitation effort.

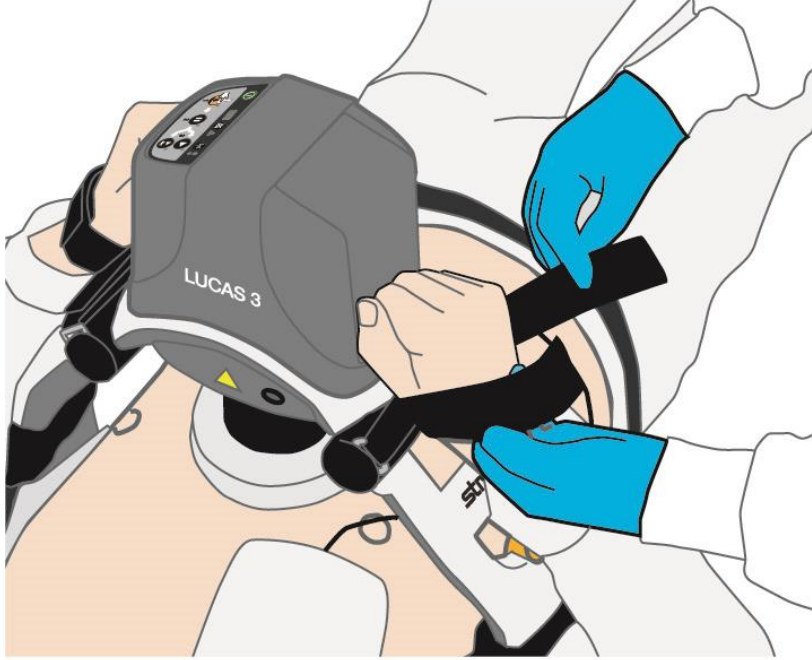
Note: Delay the application of the LUCAS stabilization strap if this prevents or delays any medical treatment of the patient.



Move the patient: Secure the patient's arms

- ✓ Use the patient straps to facilitate patient transportation
- ✓ Make sure that IV access is not obstructed when using patient straps

Do not lift LUCAS by the patient straps.



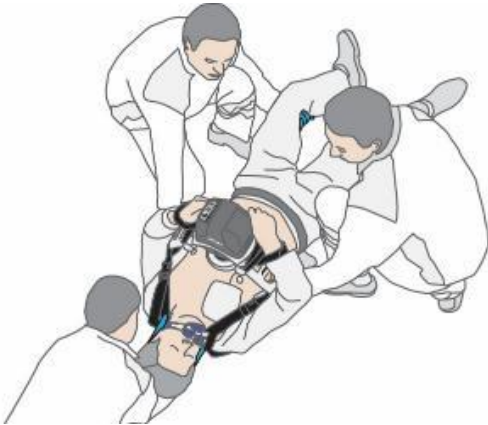
Defibrillation

- PAUSE compressions for ECG analysis
 - ✓ If shock is indicated, defibrillate during LUCAS compressions or during pause, according to your local protocols
- Defibrillation can be performed while the LUCAS device operates
 - ✓ You can apply the defibrillation electrodes before or after the LUCAS device has been put in position
 - ✓ Make sure pads or wires are not under the suction cup
 - ✓ Perform the defibrillation according to the instructions from the manufacturer of the defibrillator
 - ✓ After defibrillation, make sure that the position of the suction cup is correct. If necessary, adjust the position

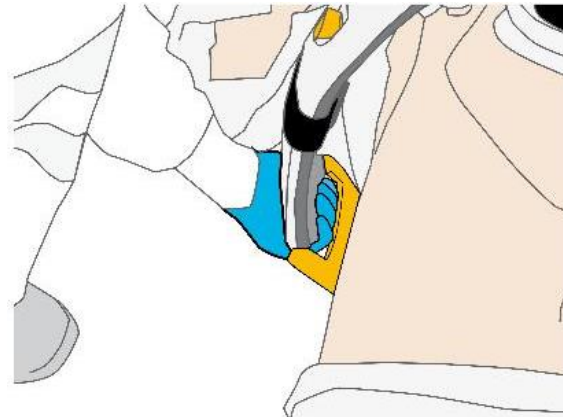
CPR during transport

Lift the patient

1. One person on each side and one person supporting the patient's head, even with stabilization strap in place.



2. Those at the patient's side will lift with one hand beneath the claw locks of the back plate, keeping fingers clear of the claw locks, while the other hand lifts patient's leg.

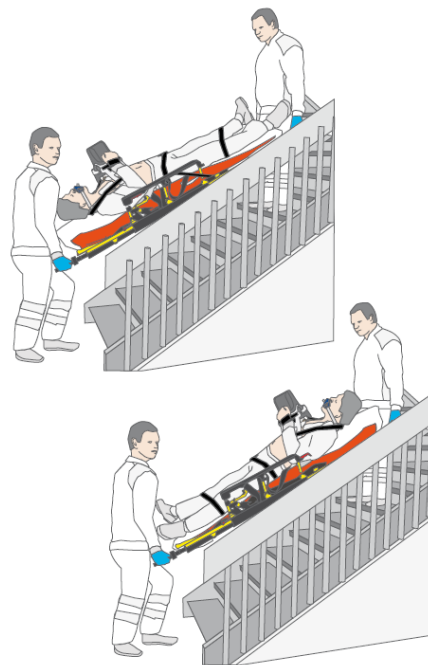


CPR during transport

LUCAS can be active while you lift and move the patient if:


- LUCAS and the patient are safely positioned on the transportation device
- LUCAS stays in the correct position and angle on the patient's chest

If necessary, adjust the position of the suction cup.






Exchange battery during operation

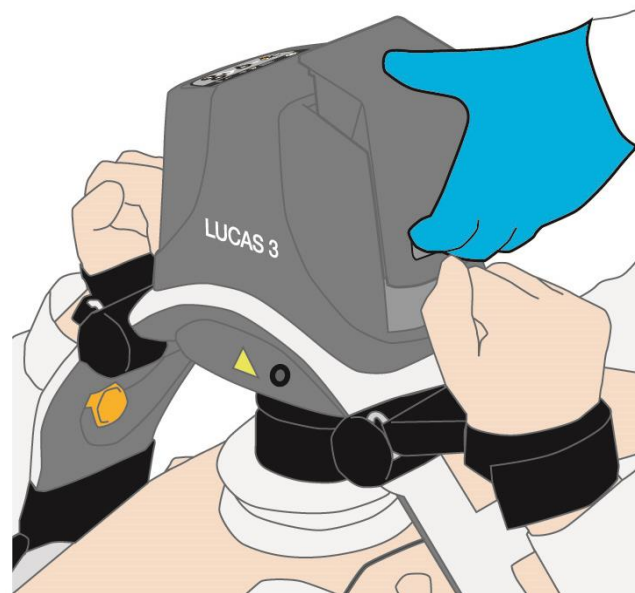
“Smart Restart”

When the battery charge is low, the LUCAS alarms with an intermittent yellow LED and an alarm signal. 

Keep interruptions to a minimum while changing the battery.

- ✓ Push PAUSE to temporarily stop the compressions
- ✓ Remove battery 
- ✓ Insert fully-charged battery
- ✓ Push ACTIVE (continuous)  or ACTIVE (30:2)  to start compressions again

“Smart Restart” – LUCAS remembers the settings and start position for 60 seconds.

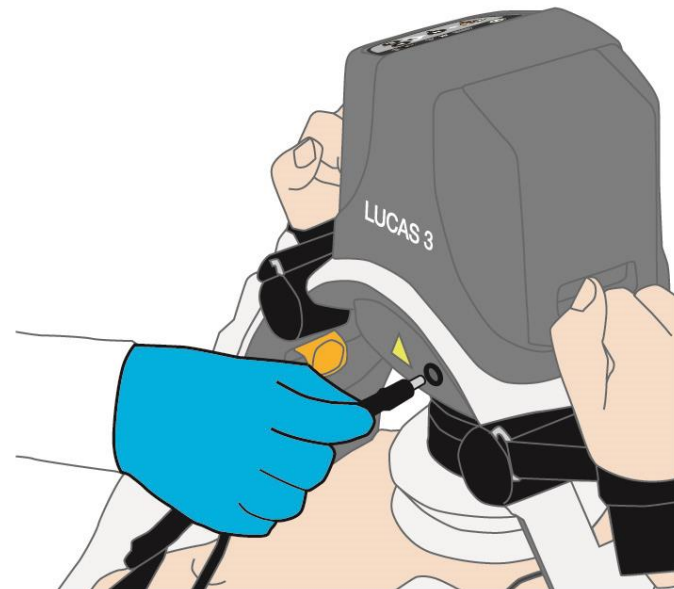


Connect to external power supply

You can connect the LUCAS power supply or car power cable in all operation modes of the LUCAS device.


- ✓ Connect the power adapter to the DC input on the side of the LUCAS device
- ✓ Connect the power adapter (power supply or car power cable) to appropriate power outlet (100-240V or 12-28VDC)

The battery must always be installed for the LUCAS device to operate, even when powered by the external power supply.




Remove LUCAS from the patient

If there are interruptions, or the compressions are not sufficient, or something unusual occurs during operation:

✓ Push ON/OFF  for 1 second to stop mechanical chest compressions

- **Immediately start manual compressions!**

After use remove the LUCAS device

✓ Push ON/OFF  for 1 second to stop mechanical chest compressions

✓ Remove the stabilization strap and patient's straps

✓ Pull the release rings and remove the upper part

✓ Remove the back plate if the condition of the patient allows

✓ Remove the device from the patient

High-priority alarm

- ✓ Battery charge is too low and compressions will stop

If you do not have a charged battery at hand, remove the stabilization strap and the LUCAS device, and resume manual chest compressions immediately.

Examples of other reasons for the high-priority alarm:

- ✓ Temperature is too high
- ✓ Compression pattern outside limits
- ✓ Hardware error

If LUCAS does not operate properly:

**Remove the stabilization strap and device.
Start manual chest compressions immediately.**



Troubleshooting

For troubleshooting, indications, and alerts during normal operation, **refer to Chapter 8 of the LUCAS 3 Instructions for Use.**

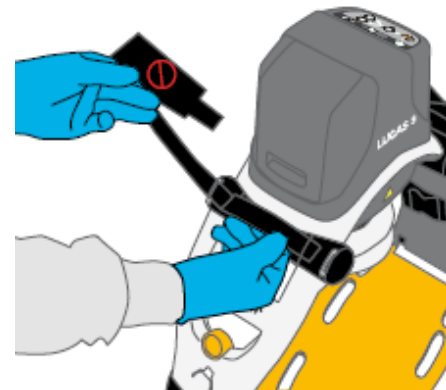
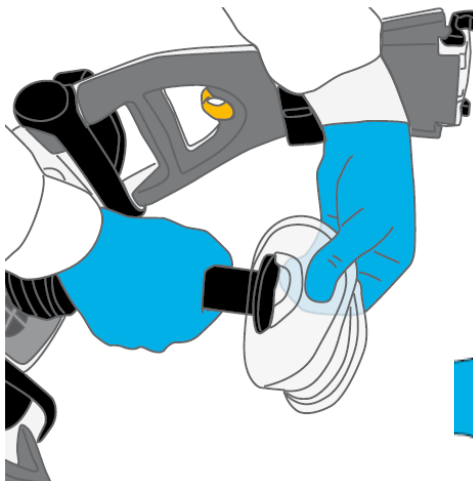
Maintenance,
care after use
and
preparations
for next use



After use of the LUCAS device

- ✓ Remove and discard the suction cup
- ✓ Mount new suction cup
- ✓ Remove patient and stabilization straps and clean separately
- ✓ Clean device
- ✓ Remove and recharge battery

Refer to Chapter 6 of the LUCAS 3 Instructions for Use.



Cleaning routines

Clean all surfaces and straps with a soft cloth and warm water with a mild cleaning agent or disinfectant agent:

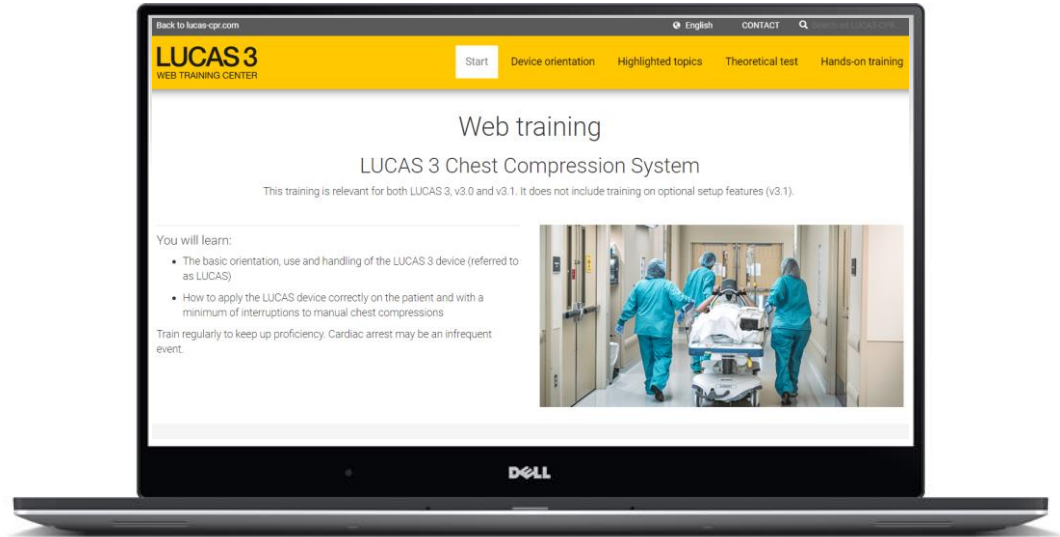
- 70% isopropyl alcohol solution
- 45% isopropyl alcohol with added detergent
- Quaternary ammonium compound
- 10% bleach
- Peracetic (peroxide) acid solutions

Follow the handling instructions from the manufacturer of the disinfectant.

For more theoretical and practical training on LUCAS...

...please visit lucas-cpr.com/web_training/lucas3

- ✓ Basic orientation, use and handling on the LUCAS device with a theoretical test
- ✓ Train to apply the LUCAS device hands-on and do a performance evaluation
- ✓ Platform available in multiple languages



Thank you
for your attention!



Based on IFU 101034-00 Rev F

For further information, please contact Stryker at 800 442 1142 (U.S.), 800 668 8323 (Canada) or visit our website at strykeremergencycare.com

Emergency Care

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The information presented is intended to demonstrate Stryker's product offerings. A healthcare professional must always refer to operating instructions for complete directions for use indications, contraindications, warnings, cautions, and potential adverse events, before using any of Stryker's products. Products may not be available in all markets because product availability is subject to the regulatory and/or medical practices in individual markets. Please contact your representative if you have questions about the availability of Stryker's products in your area. Specifications subject to change without notice.

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