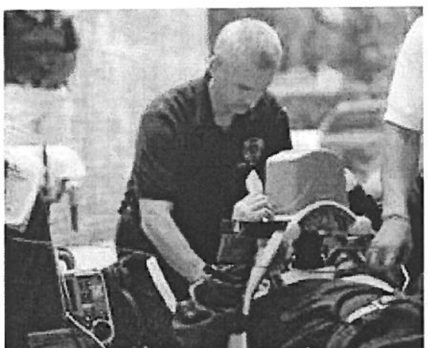
PHYSIO CONTROL

Why choose LUCAS?

Clinical Overview

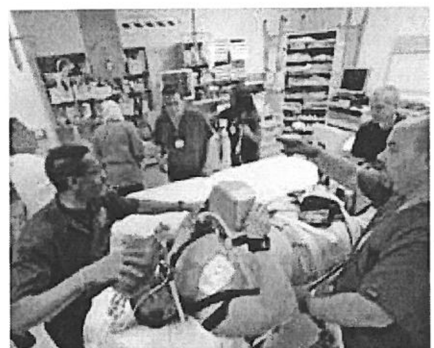
LUCAS® 2 CHEST COMPRESSION SYSTEM

1 LUCAS delivers effective and consistent chest compressions with a minimum of interruptions.



At the scene

On the move



In the hospital

Better than manual CPR...

LUCAS delivers compressions according to guidelines:

- > 5cm/2" depth
- > 100 compressions per minute
- equal time for compression / decompression
- full chest recoil

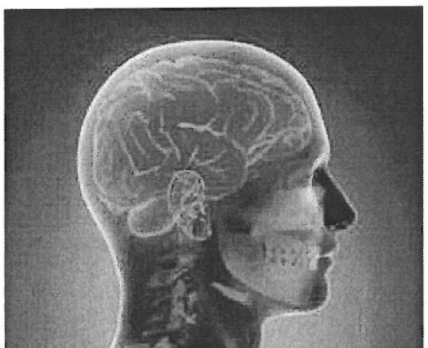
LUCAS has shown to **significantly improve quality and increase consistency of compressions** compared to manual CPR, both at the scene, during ambulance or helicopter transportation, as well as in the cath lab setting.[1-3]

...with less interruptions

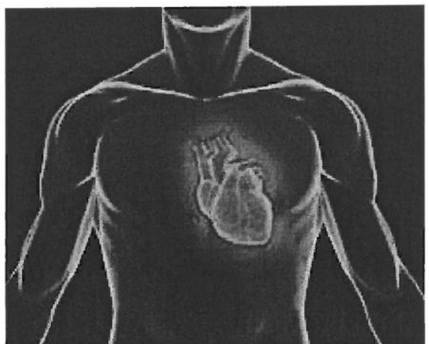
In prehospital use, at the scene and during transportation,[4, 5] LUCAS has shown to **significantly increase chest compression fractions** to around 90% compared to manual CPR.

2

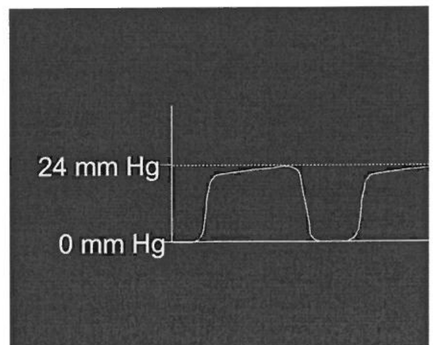
LUCAS helps sustain blood circulation to the brain, the heart and vital organs.



Increased flow to the brain



>15mmHg threshold for ROSC



+20% $EtCO_2$

Increased flow to the brain

LUCAS has shown to **improve blood flow to the brain** compared to manual CPR in prehospital patients (60% increase as measured by Doppler).[6] These findings are consistent with results from experimental studies.[7] In addition, brain circulation as measured by cerebral oximetry during prolonged LUCAS compressions has shown values exceeding previously published values during manual CPR.[8]

>15mmHg threshold for ROSC

Both human[9, 10] and experimental[11, 12] studies have shown that LUCAS can **produce coronary perfusion pressures of over 15mmHg** during prolonged CPR, better than manual CPR.

+20% $EtCO_2$

LUCAS has shown to **significantly increase $EtCO_2$ levels**, compared to manual CPR in a prehospital, controlled clinical study[13] as well as in experimental studies.[7, 14]

3 LUCAS allows for lifesaving interventions.

The H's and T's

H
- HYPOXIA
- HYPOVOLEMIA
- HYDROGEN ION (ACIDOSIS)
- HYPO-/HYPERKALEMIA
- HYPOTHERMIA

T
- TOXINS
- TAMPONADE (CARDIAC)
- TENSION PNEUMOTHORAX
- THROMBOSIS, PULMONARY
- THROMBOSIS, CORONARY

Treatable causes of SCA[15]

LUCAS in the cath lab — Class IIa (LOE C)

American Heart Association®

Mechanical chest compressions during PCI

LUCAS during PCI

Treat the cause during prolonged CPR

The importance of diagnosing and treating the underlying cause (known as the H's and the T's) is fundamental to the management of all cardiac arrest rhythms.[15]

LUCAS has **helped save patients** whose cardiac arrest required treatment of the underlying cause, such as:

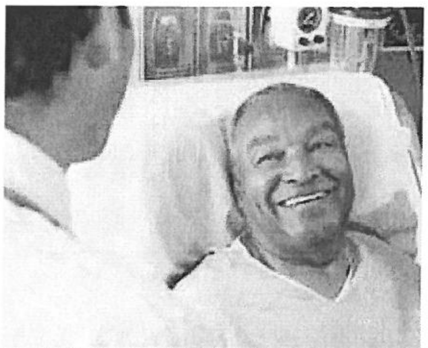
- coronary artery infarction treated with PCI during CPR[16-19]
- pulmonary emboli treated with prolonged CPR and thrombolysis[20-22]
- accidental hypothermia and/or submersion[23-28]
- electrolytical imbalances[29, 30]
- cardiac arrest due to anaphylactic shock[31]

Several more therapy-resistant cardiac arrests requiring long resuscitation efforts, many over an hour, have been reported with LUCAS and with **good neurological outcomes.**[32-36]

PCI during LUCAS chest compressions

Mechanical chest compressions have an **AHA class IIa** recommendation for use during emergency coronary intervention in the cath lab, based mainly on LUCAS references.[37]

④ LUCAS delivers safe chest compressions for patients and responders.



Safe for the patient

Improved safety during transit

Reduced fatigue and back pain

Safe for the patient

Autopsy studies have shown that LUCAS compressions are **safe for the patient**, with the same type of side-effects as for manual CPR. [38-41]

EMS and hospital organizations around the world have reported good, improved or neutral short term outcomes [42-48] as well as **improved neurological outcomes** [49] after implementing LUCAS.

Improved responder safety

Effective CPR is hard work, tiring and could cause injury to a rescuer's back. One study showed that ~60% of rescuers always experienced back discomfort when providing manual CPR. [50] LUCAS facilitates effective CPR and removes the issue of the "mattress effect". CPR related back injuries can be reduced among the staff.

In the case of transporting patients during ongoing CPR, rescuers can sit **safely belted** in ambulances **or harnessed** during take-off and landing in helicopters.

In the cath lab, CPR providers can stay out of the immediate X-ray field.

Referenced publications

The references in this document are a selection from over 100 publications available on the LUCAS Chest Compression System (as of March 2013).

If you want to see the comprehensive list, please ask your LUCAS sales representative for a copy of the LUCAS Reference List or the LUCAS Summarized Bibliography.

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All claims valid as of May 2013.

For further information, please contact Physio-Control at 800.442.1142 (U.S.), 800.895.5896 (Canada) or visit our website at www.physio-control.com.

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GDR 3315560_A

Product Comparison

LUCAS® 2 Chest Compression System
vs. Zoll® AutoPulse® Non-invasive
Cardiac Support Pump

	LUCAS 2 chest compression system	AutoPulse
WHICH COMPRESSION DEVICE TO USE?		
Compressions per minute	at least 100	80 ±5
Compression depth	2.1 ± 0.1 (5 - 5.6 cm)	20% reduction in anterior-posterior chest depth +0.25/-0.5 inches (+0.6/-1.3 cm)
Compression method	Sternal Compressions	Circumferential Compressions
Compression forces at work	Intrathoracic pressure gradient differences	Intrathoracic pressure gradient differences
Power source	Rechargeable Lithium-ion Polymer Battery 3.3 Ah (typical)	Rechargeable Nickel Metal Hydride Battery 3.2 Ah (typical)
Typical operating time on one battery	45 minutes	30 minutes
Charge time between uses	Less than 4 hours	Less than 4.25 hours
Total solution weight (in carry case with extra battery)	22 lbs (10 kg)	39 lbs (18 kg)
Device weight (with battery)	17.2 lbs (7.8 kg)	25.6 lbs (11.6 kg)
Battery weight	1.3 lbs (0.59 kg)	5.1 lbs (2.3 kg)
Patient size	Sternal height of 6.7 to 11.9 inches (17 to 30.3 cm)	Chest circumference of 29.9 to 51.2 in (76 to 130 cm)
Chest width limits	Up to 17.7 inches (44.9 cm)	9.8 to 15 inches (25 to 38 cm)
Patient weight	The use of LUCAS is not restricted by patient weight	The AutoPulse is designed for adults with weight of no more than 300 lbs (136 kg)
Time to apply device	Interruptions in manual compressions of <20 seconds	Not specified
IP Rating	44	24
COST OF OWNERSHIP		
Cost of Device	$14,495.00	$10,995.00
Service support	$1,095.00	$1,095.00
Carry case	included with device	$395.00
Batteries (for 1.5 hours run time)	$615.00 (1 battery included with device)	$1,725.00 (no batteries included with device)
Charger	$945.00	$1,795.00
Disposable (3 pack) starter kit	included with device	$375.00
Initial Investment	**$17,150.00**	**$16,380.00**
COST PER USE		
Battery	$2.97	$5.75
Disposable	$40.00	$125.00
Standard operating costs over 1 year (100 uses)	**$4,297.00**	**$13,075.00**
Standard operating costs over 5 years (500 uses)	**$21,485.00**	**$65,375.00**

LUCAS is very easy to use and requires fewer steps to apply than AutoPulse. LUCAS can be applied with interruptions to compressions of less than 20 seconds.

LUCAS 2 chest compression system

STEPS FOR OPERATION

1. Push on/off for 1 second to power up
2. Carefully put the back plate under the patient, immediately below armpits
3. Pull release rings to make sure claw locks are open and then let go of the release rings
4. Attach the support leg nearest to you on the back plate
5. Attach the other support leg to the back plate and listen for click
6. Pull up once to be sure parts are correctly attached
7. Center the suction cup over the chest, with lower edge immediately above the end of the sternum
8. Press the adjust button on the device and push down on the suction cup with two fingers until pressure pad touches patient's chest
9. Press pause to lock suction cup in place
10. Push activate to start compressions

Note: Defibrillation pads can be applied after LUCAS is applied and running

Refer to your compression device operating instructions for actual operation of the device.

AutoPulse

STEPS FOR OPERATION

1. Power up the AutoPulse
2. Sit patient up, make a single cut down the back of patient's clothing
3. Place posterior defibrillation/pacing pad on patient's back, if using anterior/posterior placement
4. Slide AutoPulse into position behind the sitting patient and lay the patient down onto the platform
5. Grasp clothing by the sleeves and pull down towards ankles to remove from both the front and the back of the torso
6. The anterior pad may be placed at this time
7. Position patient so he/she is centered laterally and that the armpits are aligned with the AutoPulse using the yellow line positioning guides on the platform
8. Close the LifeBand® around the patient's chest
9. Properly align the two sides of the LifeBand, place on top of patient's chest
10. Locate mating slot of band over the alignment tab
11. Press bands together to engage and secure Velcro® fastener
12. Lift up the LifeBand to the fullest, ensuring that the side bands are at a 90 degree angle to the platform, that they are not twisted or that there are no obstructions
13. Center the LifeBand on the patient's chest, placing it such that its center is over the area upon which manual compressions are conducted
14. Make sure the yellow upper edge of the LifeBand is aligned with patient's armpits and is over the yellow line on the AutoPulse platform
15. Press and release the start button once to begin compressions

REFERENCE DOCUMENTS

- Power source cost per use is based on total number of uses per battery (200 for LUCAS 2 battery, 100 for AutoPulse battery)..
- All ZOLL AutoPulse pricing is based on 2011 quotes.
- ZOLL AutoPulse service plan listed is for a 1-year extended warranty for depot repair.
- LUCAS 2 Chest Compression System Instructions for Use (26500-003434, 2011).
- AutoPulse Resuscitation System Model 10 User Guide (P/N 11440-001, Rev. 3 2009).

For further information please call 1.800.442.1142 or visit www.physio-control.com

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LUCAS References who switched from AutoPulse (in FLORIDA):

Hallandale Beach Fire Rescue
Chief Mark Ellis
EMS Division Chief
Tel: 954-457-1481
mellis@hallandalebeachfl.gov

Palm Beach Gardens Fire Rescue
Chief James Ippolito
Division Chief – Emergency Medical Services
Tel: 561-799-4316
Jippolito@pbgfl.com

Riviera Beach Fire Rescue
Chief Tom McCarthy
Division Chief of EMS
(O) 561-845-4109
(C) 561-248-1145
tmccarthy@rivierabch.com

Tamarac Fire Rescue
Lt. Patty Pyke
Logistics Officer
Tel: 954-597-3826
Patty.Pyke@tamarac.org

North Palm Beach Fire Rescue
Captain Andrew Lezza
EMS Captain
Tel: 561-841-3319
alezza@village-npb.org

Leon County EMS
Tallahassee, FL
Chief Chad Abrams
850-606-2100
abramsc@leoncountyfl.gov

LUCAS References who switched from AutoPulse (outside of FL):

D.C. Fire & EMS – 16 LUCAS
Washington, DC

Keith Long
keith.long@dc.gov
Dr. David Miramontes, Medical Director at the time, recommended change, but he is no longer there. Happily switched from AutoPulse primarily because of numerous battery issues & heaviness compared to LUCAS devices.

Newton Medical Center EMS
Covington, GA
Kevin Johnson—Director
mkjohnson@newtonmedical.com
His comments:
The biggest issue with the AutoPulse is the recurring cost, the weight and the rotation of the battery systems (fluids can leak into the electronics).
We are big advocates for the LUCAS and think they rock. Light weight, easy to set up and carry with the patient (hate the bags they come in, need duffle bags).
If anyone needs to call me about either unit, feel free to forward my name. KJ

Plano Fire Dept. – 14 LUCAS
Plano, TX
Dan Anderson
Dana@plano.gov
From Plano Physio Rep:
Dan Anderson would take the call at Plano. He actually pulled me aside shortly after they bought the 14 LUCAS for a total of 17, to tell me about an asystole patient waking up because the perfusion was so good. They are very happy. Pat and I spoke with Med Director yesterday who is very supportive.

One other thought on Plano. When we ran the numbers; discovered that what Plano was paying for all AutoPulse accessories and batteries over a 5 year period would have paid for all their LUCAS devices. We could not calculate time spent managing repairs, etc.

The problems they had with A/P were:

- Weight limit
- Batteries failing
- Body Fluids in mechanism/expensive repair
- Having to pause to shock/actually had ICD disrupt the A/P and cause shutdown
- Lots of repairs, constantly rotating devices for repair

What they liked about LUCAS is:

- No weight limit
- Batteries are very reliable
- Body Fluids are not really an issue
- Can follow the latest guidelines of shocking without stopping compressions

Local service
They use the tarp/sack to carry people down stairs. They run LUCAS with pt. in the sack.
There is a perception that it is providing better perfusion
Fast and easy setup

South Texas Emergency Care Foundation – 14 LUCAS
Harlingen, TX
Pete Moreno
Clinical/Operations
Pedro.moreno@stec-ems.org
956-564-2418 (cell)
956-364-2711 (work)
They had the AutoPulse deployed for several years. We were able to convince them of the concept of LUCAS with the LUCAS 1, and they ultimately purchased the LUCAS 2. The main reason was the medics stopped using the AutoPulse due to weight, size, cost and failures. They currently have 14 LUCAS devices on all of the front line units.

Bossier City Fire Department – 14 LUCAS
Bossier City, LA
Chief Jeff Watson
Chief of EMS
Tel: 318-741-8714
jeffrey.watson@bossierfire.com

Littleton Fire Rescue
Littleton, CO
Captain Mike Simon
EMS Captain
Tel: 303-795-3800
msimon@littletongov.org

LUCAS customers in FLORIDA who converted from AutoPulse
Fernandina Beach
Hallandale Beach Fire Rescue
Leon County
Lifeguard
North Naples Fire
North Palm Beach Fire Rescue
Palm Beach Gardens Fire Rescue
Putnam County
Riviera Beach Fire Rescue

Tamarac Fire Rescue
Tequesta Fire Rescue (approved – PO pending)

More LUCAS customers in FLORIDA

Bayflite
Boynton Beach Fire Rescue
City of Naples Fire Department
Coral Springs Fire Rescue
Fort Lauderdale Fire Rescue
Highlands County Fire
Lauderhill Fire Rescue
Little Gasparilla Island
Marathon Fire Rescue
Miami Dade County Fire Rescue (approved – PO pending)
Miramar Fire Rescue
Monroe County Fire Rescue
Palm Beach County Fire Rescue
Plantation Fire Rescue
Pompano Beach Fire Rescue
Seminole Tribe EMS
St. Johns County Fire