Ventilation during CPR with CCSV

Synchronizing lungs and heart during CPR
Chest Compression Synchronized Ventilation (CCSV) is a ventilation mode specifically designed for resuscitation. Integrated in MEDUMAT Standard², CCSV applies a pressure-controlled mechanical breath synchronized with each chest compression. This revolutionary method is proven to improve gas exchange and hemodynamics.

With CCSV ventilation mode, no gas volume can escape: the pressure in the lung is increased and the cardiac output increases. The mechanical breath delivered synchronously with the chest compression ensures that air does not escape from the lungs, maintaining or restoring the blood circulation.

An essential effect of chest compressions is an increase in the intrathoracic pressure that causes the blood circulation to be maintained or restored. But at the same time, air does escape from the lungs, which inhibits the effect of the pressure buildup and thus reduces the cardiac output. This is precisely where the CCSV ventilation mode comes into play: Due to the mechanical breath delivered synchronously with the chest compression, no gas volume can escape; the pressure in the lung is increased and the cardiac output increases.
Chest Compression Synchronized Ventilation

Compression phase
With CCSV, mechanical breaths are delivered synchronously with manual or even mechanically performed chest compressions. Due to the synchronized mechanical breath, no air escapes from the thorax. This increases the intrathoracic pressure in the compression phase. This produces:

- Increased arterial pressure
- Increased blood circulation
- Improved gas exchange

Decompression phase
In the decompression phase, the ventilator switches to expiration, which causes air to escape from the lung. At the same time, the intrathoracic pressure decreases and the venous return to the heart can occur unhindered.

Conventional resuscitation at 30:2

During chest compressions, the heart and the pulmonary vessels in the lung are compressed, which also results in air escaping from the surrounding lungs, causing a decrease in pressure.

Scientific study results comprehensibly processed – you can find these and other medical effects of CCSV in our white paper on CCSV: https://www.weinmann-emergency.com/en/downloadcenter/

Resuscitation with CCSV

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Chest Compression Synchronized Ventilation

1. Start of resuscitation
   At the emergency site, you start cardiopulmonary resuscitation as quickly as possible in the 30:2 procedure. Press the CPR button of the MEDUMAT Standard² to start the resuscitation ventilation. The MEDItrigger can be used to release the mechanical breaths manually.

2. Resuscitation ventilation with CCSV
   Let CCSV work automatically once you have secured the airway. MEDUMAT Standard² now ventilates synchronously with your continuous chest compressions – completely automatically without that ventilation parameters have to be adjusted.

3. Uninterrupted chest compressions
   Focus on the continuous chest compressions – the frequency tachometer offers you additional security! You do not have to interrupt the chest compressions for the ventilation. CCSV detects the compressions and ensures adequate ventilation even when chest compressions are being performed.

Ø From the emergency site to the hospital
4. Shock delivery required? Start the analysis!
MEDUMAT Standard² interacts perfectly with defibrillator monitoring systems like MEDUCORE Standard². If you interrupt the chest compressions for the rhythm analysis, MEDUMAT Standard² detects this and interrupts the ventilation automatically. This makes a trouble-free ECG analysis possible.

5. Continuing the chest compressions
Once you continue with chest compressions after delivering a shock, CCSV detects them and resumes synchronous ventilation.

6. Return of spontaneous circulation
If chest compressions are interrupted for a longer period of time, MEDUMAT Standard² automatically leaves CCSV mode and switches to volume-controlled backup ventilation.

7. Does resuscitation have to be repeated?
If you have to start the chest compressions again after ROSC has occurred, MEDUMAT Standard² resumes the resuscitation ventilation automatically in CCSV mode.

Whether human or machine: CCSV is compatible with different chest compression devices!
CCSV provides a new standard in ventilation during CPR

During resuscitation, continuous chest compressions and reduced hands-off time help establish the circulation required for survival.

But ventilation during continuous chest compressions has presented a challenge for decades. Until now, the sparsely standardized procedures present a risk of less than optimal ventilation due to complicated settings and thus the possibility of operating errors.

The increased use of mechanical chest compression devices presents another challenge for ventilation.

This is where CCSV comes into play: Easy to operate and optimally integrated in the resuscitation process, CCSV offers a ventilation standard for resuscitation ventilation for the first time! CCSV can also be used with customary chest compression devices.
The CCSV software option is so easy to integrate

In order for you to use CCSV, the “Flow measurement + ASB” software option must be activated. Why? CCSV adjusts the ventilation to the chest compressions and requires a trigger to release a mechanical breath. This trigger is provided by the “Flow measurement + ASB” function. In addition, the compression frequency and applied tidal volume can be monitored with this function.

Activated using an enable code

CCSV ventilation mode is available exclusively from WEINMANN Emergency as a software option for the MEDUMAT Standard™ emergency ventilator. CCSV can be activated either during initial commissioning or later.

A strong team

The “Flow measurement + ASB” and “CCSV” software options

“Flow measurement + ASB” option

Available in disposable or reusable versions. Disposable patient hose systems with flow measurement are equipped with disposable FlowCheck sensors.

CCSV option

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Simply Professional
WEINMANN Emergency is a family-owned, internationally active medical technology company. With our mobile system solutions for emergency, transport and disaster medicine, we set standards for saving human lives. In close collaboration with professional users in emergency medical services, hospitals and military medical corps, we develop innovative medical products for ventilation and defibrillation. For more than 100 years we have offered our customers a high degree of reliability, extensive experience and quality made in Germany.