Caregiver Guide

ZOLL®

ResQPOD®

Enhanced Perfusion During CPR

What is the ResQPOD ITD?

The ResQPOD® ITD is a simple, non-invasive device that delivers intrathoracic pressure regulation (IPR) therapy during basic or advanced life support CPR, which can improve perfusion. The ResQPOD ITD lowers intrathoracic pressure during the recoil phase of CPR by selectively restricting unnecessary airflow into the chest. This vacuum increases preload, lowers intracranial pressure (ICP), and improves blood flow to the brain and vital organs.

Preclinical studies have shown that the ResQPOD ITD:

- Doubles blood flow to the heart[1]
- Increases blood flow to the brain by 50%[2]
- Doubles $EtCO_2$[3]

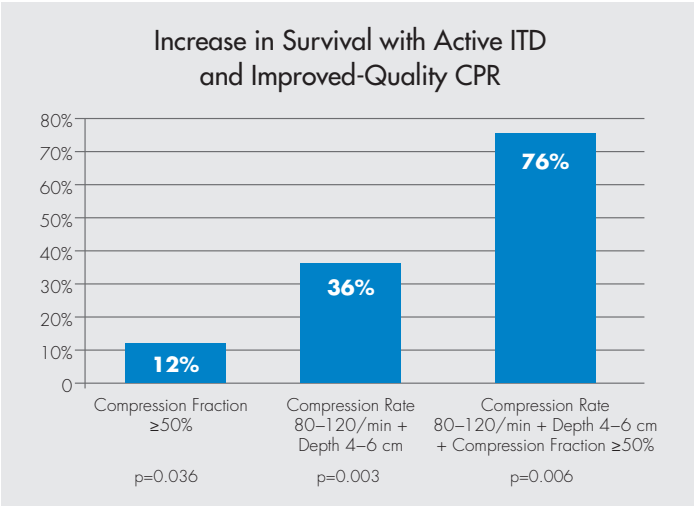
Clinical studies have shown that the ResQPOD ITD:

- Increases survival by 25% or more[4]
- Increases blood pressure by 98%[5]
- Provides benefit in all arrest rhythms[6-9]

A Deeper Look at the PRIMED Trial Finding

A new post-hoc analysis of the ROC PRIMED study by Yannopoulos, et al. found that the ResQPOD significanlty increased survival when used with high-quality CPR. The analysis found that less than 50% of the patients in the ROC study actually recieved high-quality CPR, defined as a rate of 80–120 compressions/minute, a compression depth of 4–6 cm, and a CPR fraction of > 50%.[10] However, as the CPR quality improved so did the survival impact of the ResQPOD. And when high-quality CPR was performed, patients who received the ResQPOD ITD had a significantly higher (76%) chance of survival, compared with those who received high-quality CPR alone. This analysis demonstrates the importance of utilizing tools to help monitor CPR quality since it appears to have a dose-related impact on the ResQPOD ITD's effectiveness. The better the CPR quality, the more impact the ITD has on survival.

Refer to the ResQPOD Clinical Summary for more information on this study.



How the ResQPOD ITD Works

The ResQPOD ITD offers a simple solution for more effective resuscitation.

Conventional CPR

Limited Blood Flow

Even though high-quality CPR has been shown to increase survival, it only provides 25%–40% of normal blood flow to the heart and brain.[11] Limited blood flow is due, in part, to the open airway. During chest wall recoil, air is drawn in, wiping out the vacuum (negative pressure) that is needed to fill the heart. This limits cardiac output and the blood circulated with compressions.

CPR with ResQPOD

More Blood Circulated

Attached to a facemask or other airway adjunct, the ResQPOD ITD selectively prevents air from entering the lungs during the chest wall recoil phase (except when intended with ventilations). This enhances the vacuum, which pulls more blood back into the heart and lowers intracranial pressure (ICP).[12] As a result, more blood is circulated to the brain and vital organs until the heart can be restarted. In studies, use of the ResQPOD ITD with high-quality CPR improved survival 25% or more compared with high-quality CPR without an ITD.[4,10]

	Conventional CPR	
	Without the ResQPOD ITD	With the ResQPOD ITD
Air Flow	During chest wall recoil, air flows freely back into lungs, reducing the vacuum responsible for pulling blood back into the heart	Air is selectively prevented from re-entering the lungs on chest wall recoil, enhancing the vacuum responsible for pulling blood back into the heart
Vacuum (negative pressure in chest)	Vacuum during chest wall recoil is weak; average range: -1 to -3 mmHg	Vacuum during chest wall recoil is stronger; average range: -3 to -8 mmHg
Heart Refilling (preload)	Heart refills only slightly	Refilling of heart is doubled[3]
Hemodynamics	Mean carotid blood flow: 82 ml/min.[3] Mean systolic blood pressure: 43 mmHg[5]	Mean carotid blood flow: 112 ml/min[3] Mean systolic blood pressure: 85 mmHg[5]
Intracranial Pressure (ICP)	Increases during compression Decreases slightly during chest wall recoil	Enhanced vacuum lowers ICP even further during chest wall recoil, resulting in less resistance to forward blood flow[12]
Patient Ventilation and Exhalation	Not restricted	Not restricted

Using the ResQPOD ITD on a Facemask

1. Begin chest compressions immediately.
2. Connect the ResQPOD ITD to facemask.
3. Open airway. Establish and maintain tight face seal with mask throughout. chest compressions; a head strap or two-handed technique is recommended.
4. Connect ventilation source to top of ResQPOD ITD, or mouthpiece if performing mouth-to-mask ventilation.
5. Perform CPR at recommended compression-to-ventilation ratio.
6. Place $EtCO_2$ detector between ResQPOD ITD and ventilation source (preferred).

Using the ResQPOD ITD on an Endotracheal (ET) Tube

1. Begin chest compressions immediately.
2. Confirm ET tube placement and secure with commercial tube restraint.
3. Connect the ResQPOD ITD to ET tube.
4. Connect ventilation source to the ResQPOD ITD.
5. Perform continuous chest compressions.
6. Turn on timing assist lights. Ventilate asynchronously at timing light flash rate of 10/min.
7. Administer ET meds directly into ET tube.
8. Place $EtCO_2$ detector between ResQPOD ITD and ventilation source (preferred).

Performing High-Quality CPR with the ResQPOD ITD

1. Begin chest compressions immediately
2. Avoid interruptions (CCF ≥ 80%)
3. Compress at the correct rate (100–120/min)
4. Push hard (at least 5 cm/2–2.4 inches)
5. Allow complete chest wall recoil
6. Don't hyperventilate
7. Use tools to help you get it right
   - Timing lights on the ResQPOD ITD to guide ventilations
   - CPR feedback, like ZOLL's Real CPR Help®, to guide compression rate, depth, and fraction
8. Remove secretions from ResQPOD ITD by blowing out with the ventilation source

[1]Langhelle A, et al. *Resuscitation*. 2002;52:39-48.
[2]Lurie KG, et al. *Chest*. 1998;113:1084-1090.
[3]Yanopoulos D, et al. *Critical Care Med*. 2006;34(5):1444-1449.
[4]Idris AH, Guffey D, Pepe PE, et al. *Circulation*. 2012;126:LBBS-22813-AHA.
[5]Pirrallo RG, et al. *Resuscitation*. 2005;66:13-20.
[6]Thigpen K, et al. *Respir Care*. 2010;55(8):1014-1019.
[7]Thayne R, et al. *Resuscitation*. 2005;67:103-108.
[8]Aufderheide TP, et al. *Heart Rhythm*. 2010;9(10):1357-1364.
[9]Lick CJ, et al. *Crit Care Med*. 2011;39(1):26-33.
[10]Yannopoulos D, et al. *Resuscitation*. 2015 Sep;94:106-13.
[11]Andreka P, Frenneaux MP. *Curr Opin Crit Care*. 2006;12(3):198-203.
[12]Aufderheide TP, et al. *Crit Care Med*. 2008;36(11 Suppl):S397-404.

ZOLL Medical Corporation | 269 Mill Road | Chelmsford, MA 01824 | 978-421-9655 | 800-804-4356 | www.zoll.com

Studies available upon request. The generally cleared indication for use for the ResQPOD ITD 10 available for sale in the United States (U.S.) is for a temporary increase in blood circulation during emergency care, hospital, clinic, and home use. The studies referenced here are not intended to imply specific outcomes-based claims not cleared by the U.S. FDA.

MCN EP 1506 0101