Improve Perfusion During CPR

Today, only 11% of victims of out-of-hospital cardiac arrest in the United States survive.¹ A focus on high-quality CPR and adoption of new techniques and technologies to facilitate it are helping many systems improve their outcomes. Cardiac arrest survival rates can be improved.

The ResQPOD ITD 10 Increases Perfusion During CPR

The ResQPOD Impedance Threshold Device (ITD) is a simple, non-invasive device that delivers Intrathoracic Pressure Regulation (IPR) Therapy during basic or advanced life support CPR to improve perfusion. The ITD lowers intrathoracic pressure during the recoil phase of CPR by selectively restricting unnecessary airflow into the chest. This vacuum increases preload, lowers ICP, and improves blood flow to the brain and vital organs. Pre-clinical studies have shown that the ResQPOD ITD 10:

- Doubles blood flow to the heart²
- Increases blood flow to the brain by 50%³
- Doubles ETCO₂⁴

When used with high-quality manual CPR, the ITD has been shown in clinical studies to improve survival by 25% or more.⁵⁻¹⁰
Attached to a facemask or other airway adjunct, the ResQPOD ITD contains airway pressure-sensing valves to selectively prevent air from entering the chest during chest wall recoil. This enhances the vacuum that pulls blood back to the heart, increasing preload. Patient ventilation and exhalation are not restricted. Timing lights flash at 10 per minute and guide ventilations at the AHA-recommended rate to discourage hyperventilation.

**ResQPOD Features and Benefits**

- Easy to integrate into resuscitation protocols
- Can be used during BLS and ALS care
- Compatible with all airway adjuncts and ventilation sources
- Timing lights guide ventilations at 10/minute
- Compatible with automated CPR devices
- Cost effective

**ResQCPR™ – A SYSTEM FOR SURVIVAL**

The ResQCPR™ System combines the power of an ITD with the ResQPUMP Active Compression Decompression CPR (ACD-CPR) Device – the only FDA-approved device intended to perform ACD-CPR and actively lift the chest during chest wall recoil to further enhance negative intrathoracic pressure. The device combination works synergistically to optimize the vacuum and improve hemodynamics. A pre-clinical study showed that ResQCPR provided near-normal blood flow to the brain during CPR. More importantly, a clinical study showed a 49% increase in survival to one year in adult patients in cardiac arrest from cardiac etiology who received the ResQCPR System.
Studies Support Use of the ResQPOD ITD

Improved Blood Pressure with an ITD

A CLINICAL STUDY SHOWED A 98% INCREASE IN SYSTOLIC BP WHEN AN ITD IS USED.

![Graph showing increased systolic blood pressure with ITD use](image1)

- **CPR**
- **CPR + ResQPOD**

*98% improvement p<0.01


Improved Blood Flow to the Brain with an ITD

PRE-CLINICAL DATA SHOWED A 50% INCREASE IN BLOOD FLOW TO THE BRAIN WHEN AN ITD IS USED.

![Graph showing increased cerebral blood flow with ITD use](image2)

- **CPR**
- **CPR + ResQPOD**

*50% improvement p<0.05


Relative Increase in Survival with Active ITD

An analysis of the ROC PRIMED data by Yannopoulos et al showed that when an ITD was used, survival rates improved as the quality of CPR improved. Performance of CPR at a rate of 80-120 compressions/min, a compression depth of 4-6 cm, with a fraction of ≥ 50% resulted in the highest survival rates when an ITD was used vs. a sham ITD.

![Graph showing increased survival rates](image3)

- **Compression Fraction > 50%**
- **Compression Rate 80-120/min & Depth 4-6 cm**
- **Compression Rates 80-120/min & Depth 4-6 cm & Fraction ≥ 50%**

*12%*p=0.036

*45%*p=0.003

*76%*p=0.006

Yannopoulos et al. Circulation 2014;130:A9

Recommended by the American Heart Association (AHA) – Like other current CPR adjuncts and medications, an ITD carries a Class IIb recommendation in the AHA Guidelines.
Enhancing Perfusion During CPR

The ResQPOD Impedance Threshold Device (ITD) enhances circulation during basic or advanced life support CPR. This simple, non-invasive device regulates pressures in the chest and improves blood flow to the heart and brain.

**Conventional CPR**

<table>
<thead>
<tr>
<th>CHEST COMPRESSION</th>
<th>CHEST WALL RECOIL</th>
<th>Airway Pressures</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSTOLIC BP (mmHg)</td>
<td>43</td>
<td></td>
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<tr>
<td>DIASTOLIC BP (mmHg)</td>
<td>15</td>
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</tbody>
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**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. Limited blood flow is due, in part, to the open airway. During chest wall recoil, air is drawn in and wipes out the vacuum (negative pressure) that is needed to fill the heart. This limits cardiac output and blood circulated with compressions.

**CPR with ResQPOD® ITD 10**

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<tbody>
<tr>
<td>SYSTOLIC BP (mmHg)</td>
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<tr>
<td>DIASTOLIC BP (mmHg)</td>
<td>20</td>
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**CPR with the ResQPOD ITD – More Blood Circulated**

Attached to a facemask or other airway adjunct, the ResQPOD 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). 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 with high-quality CPR improved survival 25% or more compared to high-quality CPR without an ITD.
ZOLL CPR Quality Tools

ZOLL’s CPR technology can help you achieve the highest quality CPR and ensure your patients get the full benefit of the ResQPOD ITD. This easy-to-use technology works seamlessly with ZOLL monitors and provides real-time feedback on CPR quality.

Real CPR Help®
Real CPR Help® alerts rescuers when compressions fall out of range. When medics are fresh and delivering good compressions, it is silent. As fatigue sets in and compression quality erodes, prompts gently guide them back to high-quality compressions.

CPR Dashboard™
The CPR Dashboard™ is a real-time window that gives team leaders an at-a-glance look at the quality of CPR compressions.

See-Thru CPR®
See-Thru CPR® reduces the length of interruptions with a filter that lets responders see underlying organized rhythms during compressions.

ZOLL AutoPulse®
Automated CPR is a simple and reliable way to achieve and maintain high-quality CPR. The ZOLL AutoPulse® is a device that moves more blood, more consistently than is possible with manual compressions.16-18 Easy to use and battery operated, its load-distributing LifeBand® squeezes the entire chest, delivering high-quality CPR both at the scene and on the move.
Studies available upon request. The generally cleared indication for the ResQPOD ITD 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. Research is ongoing in the US to evaluate the long-term benefit of the ResQPOD for other specific indications. The studies referenced here are not intended to imply specific outcomes-based claims not yet cleared by the US FDA.

### Products

<table>
<thead>
<tr>
<th>PRODUCT</th>
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<td>ResQPOD ITD 10</td>
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