

**The Avery Diaphragm Pacemaker,** providing a higher quality of life and lower cost of care, is an alternative to the mechanical ventilator for those with quadriplegia, central sleep apnea, and diaphragm paralysis.

### What is a Diaphragm Pacemaker?

A diaphragm pacemaker is an implanted phrenic nerve stimulator. It consists of surgically implanted electrodes and receivers and an external transmitter which sends radio signals to the implants via flexible antennas that are secured over the receivers.

### How does it work?

The transmitter generates a series of impulses which are sent by the antenna through the skin as a radio wave. The receiver converts the radio waves to an electrical impulse which travels down the electrode to the phrenic nerve. The nerve then sends these impulses to the diaphragm causing it to contract, and draw air in. When the impulses stop, the diaphragm relaxes, and exhalation occurs. These series of impulses are repeated cyclically, resulting in a natural breathing pattern over the receivers.



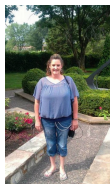
Cash  
(CCHS)



Brodie  
(SCI)



Carl  
(CSA)



Tina  
(CHS)

### Who are candidates for pacing?

Diaphragm pacemakers are indicated for adult and pediatric patients who would otherwise be dependent on mechanical ventilation. Intact or repaired phrenic nerves and functional lungs and diaphragm muscle are necessary for the device to work properly.

Typical patients have:

- High spinal cord (C1 - C3) or brainstem injuries
- Congenital or acquired central hypoventilation syndromes
- Diaphragm paralysis of various etiologies

### Advantages

- Superior to mechanical ventilation (MV) because it uses negative pressure versus the forced positive pressure of MV.
- Allows for natural breathing and speech patterns.
- Eases eating and drinking.
- Improves the quality of speech.
- Improves sense of smell.
- Small, portable and silent allowing for greater mobility and participation in social and educational activities.
- Significantly reduces upper airway infections.
- Saves over \$20,000 a year in ventilator-related expenses.
- Less than \$1,000 a year for disposable supplies.
- Reimbursed by Medicare and most private and government insurance around the world.
- Full US FDA PMA approval and CE Marked under the European AIMDD for adult and pediatric use.
- No percutaneous wires which can result in chronic infection risk and ongoing wound management care.



Emily  
(CCHS)



Nicole  
(SCI)



Martina  
(CHS)



Libanier  
(DP)

## Vent-Free Breathing

61 Mall Drive • Commack, NY 11725-5703 USA • Phone: 631-864-1600 • Fax: 631-864-1610

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