

NeuRx DPS™ Fact Sheet

- THE DEVICE:** The NeuRx Diaphragm Pacing System (DPS)™ was developed through a joint effort of physicians and engineers at several institutions with initial funding of \$1 million by the Department of Veterans Affairs. The NeuRx DPS™ allows patients with conditions affecting their respiratory muscles and nerves to breathe without a ventilator. In 2009, the NeuRx DPS™ ranked 3rd at the prestigious 6th annual Cleveland Clinic Medical Innovations Summit for the Top 10 Medical Innovations for 2009.
- HOW IT WORKS:** The NeuRx DPS™ consists of four electrodes implanted in the diaphragm to stimulate the muscle, a fifth electrode under the skin to complete the electrical circuit, a connector holder, a cable and an external battery-powered pulse generator. The pulse generator provides the timing and control of stimulus to regulate movement of the diaphragm muscle, creating a vacuum-like effect in the chest cavity that allows air to enter the lungs. When this contraction eases, the air is expelled from the lungs. On average, this process is repeated 10-14 times per minute.
- THE SURGICAL PROCEDURE:** As a form of minimally invasive laparoscopic surgery, surgeons create four dime-size holes in the abdomen and insert a laparoscope to see the diaphragm muscle. The surgeon will then place small, 1/2mm thick, electrodes in areas near the phrenic nerves that control the diaphragm contractions. The electrodes are attached through wires under the skin to a small battery powered external pulse generator (EPG) that stimulates the muscle and phrenic nerves to cause the contraction of the diaphragm.
- The surgery is done with only an overnight stay for observation. After surgery, the EPG is programmed for the volume of air taken in during diaphragm contractions. This creates an effective yet comfortable breathe. Because a patient diaphragm atrophies while on a ventilator, at first they can only breathe using the NeuRx DPS™ for a short period of time. Patients have to perform daily physical therapy to strengthen their diaphragm, called conditioning, to extend the amount of time off of the ventilator. Patients begin conditioning in the hospital, at a rehab hospital or at home.
- ITS SUCCESS:** Over 150 spinal cord injuries patients, including Christopher Reeve, have been treated at leading centers around the US with the NeuRx DPS™. A list of treatment centers can be found at www.synapsebiomedical.com/products/us_sci.shtml.
- Synapse continues to work on expanding the indications for use of the NeuRx DPS™. In 2009 they completed their 88 patient clinical trials on the NeuRx DPS™ to treat Amyotrophic Lateral Sclerosis (ALS), aka Lou Gehrig's disease. Later that year, Synapse submitted their ALS trial findings for treating chronic hypoventilation to the FDA for review and approval under a Humanitarian Device Exemption (HDE).