

# Respiratory, Ventilator and Trach Resources



As we breathe, oxygen in the air is brought into the lungs and into close contact with the blood, which absorbs it and carries it to all parts of the body. At the same time, the blood gives up carbon dioxide, which is carried out of the lungs with air breathed out.

Lungs are not affected by paralysis. However, the muscles of the chest, abdomen, and diaphragm can be affected. As the various breathing muscles contract, they allow the lungs to expand, which changes the pressure inside the chest so that air rushes into the lungs. This is inhaling – which requires muscle strength. As those same muscles relax, the air flows back out of your lungs, and you exhale.

If paralysis occurs at the C-3 level or higher, the phrenic nerve is no longer stimulated and therefore the diaphragm does not function. This means mechanical assistance -- usually a ventilator -- will be needed to breathe.

Persons with paralysis at the mid-thoracic level and higher will have trouble taking a deep breath and exhaling forcefully. Because they don't have use of abdominal or intercostal muscles, these people have also lost the ability to forcefully cough. This can lead to lung congestion and respiratory infections.

Moreover, secretions can act as glue, causing the sides of your airways to stick together and not inflate properly. This is called atelectasis, or a collapse of part of the lung. Many people with paralysis are at risk for this. Some people have a harder time getting rid of any colds or respiratory infections and have what feels like a constant chest cold. Pneumonia is a possibility if secretions become the breeding ground for various bacteria.

A useful technique is the assisted cough: an assistant firmly pushing against the outside of the stomach and upwards, substituting for the abdominal muscle action that usually makes for a strong cough. This is much gentler than the Heimlich maneuver and it's important to coordinate pushes with natural breathing rhythms.

Another technique is percussion: this is basically a light drumming on the ribcage to help loosen up congestions in your lungs.

Postural drainage: This uses gravity to drain secretions from the bottom of your lungs up higher into your chest where one can either cough them up and out, or get them up high enough to swallow. This usually works when the head is lower than the feet for 15 or 20 minutes.

Ventilator users with tracheostomies need to have secretions suctioned from their lungs on a regular basis; this may be needed anywhere from every half hour to only once a day.

## **Ventilators**

There are two basic types of mechanical ventilator. Negative pressure ventilators, such as the iron lung, create a vacuum around the outside of the chest, causing the chest to expand and suck air into the lungs. Positive pressure ventilators, which have been available since the 1940s, work on the opposite principle, by blowing air directly into the lungs.

A small face mask can also be used over the nose and/or the mouth for positive pressure ventilation. For patients who need breathing assistance only part of the time, such non-invasive means offer a way to avoid the complications associated with tracheostomies.

Another technique breathing involves the implantation of an electronic device in the chest to stimulate the phrenic nerve and send a regular signal to the diaphragm, causing it to

contract and fill the lungs with air. Phrenic nerve pacers have been available since the late 1950s but are expensive and are not widely used.

## **Tracheostomy care**

There are many potential complications related to tracheostomy tubes, including the inability to speak or swallow normally. Certain tracheostomy tubes are designed to direct air upward during exhalation and thus permit speech during regular, periodic intervals.

Another tracheostomy-associated complication is infection. The tube is a foreign body in the neck and has the potential of introducing organisms that would ordinarily be stopped by natural defense mechanisms in the nose and mouth. Cleaning and dressing of the tracheostomy site on a daily basis is an important preventive measure.

Sources: Craig Hospital, University of Miami School of Medicine, University of Washington School of Medicine/Department of Rehabilitation Medicine.

## **Websites**

### **Aaron's Tracheostomy Page**

<http://www.tracheostomy.com/>

This site's mission is to provide information on tracheostomy and to facilitate parent-to-parent networking and support. There is a lot of information on pediatric trach care and links to other resources, including listservs on adult and pediatric tracheostomies.

### **Craig Hospital: Respiratory Care Resources**

<https://craighospital.org/resources/topics/respiratory-care>

### **International Ventilator Users Network (IVUN)**

<https://www.ventnews.org/>

50 Crestwood Executive Center, #440

Saint Louis, MO 63126-1916

Phone: 314-534-0475

IVUN, a resource for people who use ventilators, includes a newsletter and articles by health care professionals and venturesome vent users. The organization's mission is to enhance the lives and independence of home ventilator users and polio survivors through education, advocacy, research and networking.

### **Lincare**

<http://www.lincare.com/>

Lincare provides respiratory care, infusion therapy and medical equipment to patients in the home.

### **No Person Left Behind—Oxygen: Respiratory Disaster Planning Information**

<http://nopersonleftbehind.org/oxy/www/index.htm>

704 Homer Ave North

Lehigh Acres, Florida 33971-1142

Phone: 239-368-6846

Email: [executivedirector@nopersonleftbehind.org](mailto:executivedirector@nopersonleftbehind.org)

The mission of oxygen.NoPersonLeftBehind.org is to provide respiratory disaster information and planning guidelines to assist individuals with respiratory issues for travel, disaster evacuation or if needed stay in place during an emergency. Planning information covers respiratory breathing devices and ventilators, to include extra expendable supplies.

The respiratory planning guide provides a checklist for individuals to check if they have, need to get, or not applicable. It also provides a place for fill in the blanks for respiratory DME Information, phone numbers and respiratory medicines of a disaster or emergency. The guide also provides information on when to check or replace expendable respiratory supplies, how often to provide preventive maintenance on your devices.

### **Rutgers' New Jersey Medical School: Center for Noninvasive Mechanical Ventilation Alternatives and Pulmonary Rehabilitation**

<https://njms-web.njms.rutgers.edu/profile/myProfile.php?mbmid=bachjr>

Department of Physical Medicine & Rehabilitation

DOC Suite 3100

90 Bergen Street

Newark, NJ 07103-2499

Phone: 973-972-2802

The Center for Non-invasive Mechanical Ventilation Alternatives and Pulmonary Rehabilitation was established in 1992 and cares for patients with neuromuscular weakness and respiratory impairment. The mechanical ventilation alternatives program has successfully extubated over 203 unweanable intubated patients.

### **Shepherd Center**

<https://news.shepherd.org/making-masks-more-inclusive-modifications-meet-patients-specific-needs-and-protect-from-illness/>

Info on masks including how to make ones for ventilator users.

### **Shepherd Center: Breathing After Spinal Cord Injury**

<https://myshepherdconnection.org/respiratory/breathing-before-injury/sci/>

### **Synapse Biomedical: NeuRx Diaphragm Pacing System**

<http://www.synapsebiomedical.com/about-neurx-dps/>

E-mail: [info@synapsebiomedical.com](mailto:info@synapsebiomedical.com)

Phone: 440-774-2488

Toll-free: 888-767-3770

A breathing pacemaker approved by the FDA in June 2008 for use in certain spinal cord injured, vent-dependent persons. The site has patient information on the system and lists treatment centers and model spine centers in the U.S. They offer educational information on pacing systems: The SCI Patient's Guide to Increasing Independence with the NeuRx Diaphragm Pacing System:

[https://www.synapsebiomedical.com/wp-content/uploads/2024/07/92-0002-1\\_G-SCI-Brochure-15-JUN-2021.pdf](https://www.synapsebiomedical.com/wp-content/uploads/2024/07/92-0002-1_G-SCI-Brochure-15-JUN-2021.pdf)

## **Vent Users' Support Page**

<http://www.makoa.org/vent/index.html>

This website includes links to articles on respiratory management, product vendors, and more. There is also a mailing list people can join.

## **Newsletters**

### **Ventilator-Assisted Living**

<https://www.ventnews.org/ventilator-assisted-living>

This bi-monthly newsletter (sent electronically) from Post Polio Health International, links ventilator users, their families and peers with each other and with health professionals committed to home mechanical ventilation. Articles include such topics as family adjustments, equipment and techniques, medical issues, travel and ethical issues.

## **Pamphlets**

**Information about Ventilator-Assisted Living.** St. Louis, MO: Post-Polio Health International, 2003.

This 10-page pamphlet is available for free by calling 314-534-0475.

### **American Thoracic Society: Use of a Tracheostomy with a Child**

<https://www.thoracic.org/patients/patient-resources/resources/tracheostomy-in-child.pdf>

This 2-page pamphlet answers common questions parents have about tracheostomies and offers tips for avoiding complications.

### **American Thoracic Society: Mechanical Ventilation**

<https://www.thoracic.org/patients/patient-resources/resources/mechanical-ventilation.pdf>

This 2-page pamphlet answers common questions about ventilators and their use.

## **On Demand Videos**

### **Kessler Foundation: Pneumonia Prevention (Managing Medical Complications After Spinal Cord Injury – Part 3 of 3)**

<https://www.youtube.com/watch?v=T-jr5daLyLw>

Northern New Jersey Spinal Cord Injury System Center (NNJSCIS) has released a three-part video series, Managing Medical Complications After Spinal Cord Injury: Bowel Management, Pressure Ulcer Prevention, and Pneumonia Prevention. The 30-minute videos provide information to individuals with SCI and caregivers on management and prevention of these conditions, which can have a significant impact on day-to-day activities and quality of life if they are not managed properly.

The information contained in this message is presented for the purpose of educating and informing you about paralysis and its effects. Nothing contained in this message should be construed nor is intended to be used for medical diagnosis or treatment. It should not be used in place of the advice of your physician or other qualified health care provider. Should you have any health care related questions, please call or see your physician or other qualified health care provider promptly. Always consult with your physician or other qualified health care provider before embarking on a new treatment, diet or fitness program. You should never disregard medical advice or delay in seeking it because of something you have read in this message.

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