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

http://www.ventusers.org/index.html
International Ventilator Users Network (IVUN)
4207 Lindell Boulevard, #110
Saint Louis, MO 63108-2930
Phone: 314-534-0475
E-mail: info@ventusers.org
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.

http://njms.rutgers.edu/departments/physical_medicine___rehabilitation/non_invasive.cfm
Rutgers’ New Jersey Medical School: Center for Noninvasive Mechanical Ventilation Alternatives and Pulmonary Rehabilitation
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.

http://calder.med.miami.edu/pointis/sciman.html
University of Miami School of Medicine Rehab Team Site: Spinal Cord Injury Manual for Patients and Families
The University of Miami’s School of Medicine's Point of Care, Team-based Information System (PoinTIS) website provides comprehensive information on spinal cord injury and traumatic brain injury rehabilitation for health care providers, patients and patients families. Selecting Respiratory Management on the left side will bring up articles on breathing and respiratory tract complications and treatments.

http://www.makoa.org/vent/index.html
Vent Users’ Support Page
This website includes links to articles on respiratory management, product vendors, and more. There is also a mailing list people can join.

http://www.lincare.com/
Lincare
Lincare provides respiratory care, infusion therapy and medical equipment to patients in the home.
Aaron’s Tracheostomy Page
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.

American Journal of Respiratory and Critical Care Medicine: Care of the Child with a Chronic Tracheostomy
This Official Statement of the American Thoracic Society was adopted by the ATS Board of Directors in July 1999. It covers tracheostomy tube selection, tracheostomy tube care, suctioning, humidification, speech development, caregiver education, medications, monitoring, decannulation procedures, complications, and areas of suggested research.

Synapse: NeuRx Diaphragm Pacing System
E-mail: info@synapsebiomedical.com
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.

Craig Hospital: Respiratory Care Resources

Online Discussion Groups

Aaron’s Tracheostomy Message Boards
The message boards include forums on pediatric and adult tracheostomies and can be accessed by clicking on the Networking tab or by going directly to http://www.tracheostomy.com/forum/index.php.

Trachties Listserv
Trachties is a place for networking, sharing of ideas and resources for dealing with life with a tracheostomy. It is open to individuals with tracheostomies, friends and caretakers of kids or adults with tracheostomies.

Newsletters

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**

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

**American Thoracic Society: Use of a Tracheostomy with a Child**  
This 2-page pamphlet answers common questions parents have about tracheostomies and offers tips for avoiding complications.  

https://www.thoracic.org/patients/patient-resources/resources/mechanical-ventilation.pdf  
**American Thoracic Society: Mechanical Ventilation**  
This 2-page pamphlet answers common questions about ventilators and their use.

**Online Videos**

http://www.uab.edu/medicine/sci/uab-scims-information/secondary-conditions-of-sci-health-education-video-series  
**Spinal Cord Injury Information Network: Secondary Conditions of Spinal Cord Injury Health Education Video Series (18 minutes)**  
The Respiratory Management video can be streamed online or downloaded. It covers signs, symptoms and general treatment options of potentially life-threatening conditions and discusses self-care issues such as smoking cessation, congestion, vaccinations (influenza and pneumonia), and weight management.
The following books and videos are available for free loan from the PRC library. For more information, please visit the online catalog at: http://www1.youseemore.com/ReevePRC/default.asp

**Books**

  Presents noninvasive ventilation as an alternative to tracheostomy. It prolongs survival while decreasing the risk of pulmonary complications, hospitalizations, and costs.

  Written by the mother of a child with a tracheostomy who is also a nurse. Clear pictures and explanations of procedures and equipment.

  Explores the pros and cons of mechanical ventilation for Duchenne Muscular Dystrophy and other patients suffering from restricted breathing.

  A directory of equipment manufacturers and doctors who specialize in ventilation as well as a contact list of patients on ventilators.

  Written for healthcare professionals to facilitate discharge planning of ventilator-dependent persons.

  Written for speech-language pathologists.


  Written for health care professionals.


**Videos**

• **Breathing Easy: Children on Ventilators at School.** Distributed by Learner Managed Designs Inc. (30 minutes) This video illustrates how children assisted by ventilators can be successfully integrated into school settings. Medical therapies and psychosocial support needed to ensure that a student using a ventilator is an active participant in the classroom are described.


• **Home Tracheostomy Care for Infants and Young Children.** University of Colorado Health Sciences Center. 2000. Distributed by Learner Managed Designs Inc. This video covers the spectrum of home care needs for a child with a tracheostomy, including changing the trach tube, tying techniques, suctioning and accidental decanulation. Information on speech and feeding in connection with tracheostomies is also provided. Also available in Spanish.

• **Managing the Mechanically Ventilated Patient: Endotracheal Tubes/Chest Tubes/Aerosols.** American Association for Respiratory Care, 1997.


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