

WHAT PATIENTS AND FAMILIES CAN EXPECT AFTER LUNG VOLUME REDUCTION SURGERY

TREATMENTS RELATED TO YOUR SURGERY

In preparation for your planned lung volume reduction surgery, the following information has been put together to give you an idea as to what to expect. Remember that getting well after surgery will take your doctors, nurses, physical therapists, respiratory therapists and occupational therapists working together. But, our work is only as good as your commitment to work hard with us. We would like to have you pay close attention to three very important areas of responsibility that describe what you must do to aid in your recovery.

First, your cooperation in doing your breathing treatments is very important to keeping your lungs clear of mucus and working well.

Second, your cooperation is needed in walking after surgery. You may not feel like getting out of bed or walking. But you must do both of these activities as they both help you expand your lungs and improve the way your lungs work.

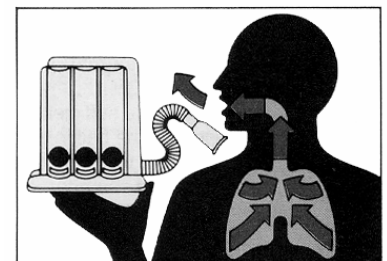
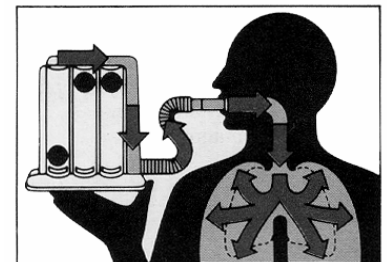
Third, you must eat enough protein to help with wound healing and to build muscle mass so that you feel stronger. Your cooperation in helping yourself get well after surgery is the most important to getting you home as soon as possible.

You will be expected to begin breathing treatments immediately after the surgery. If you have a breathing tube, your respiratory therapist will give you treatments through the ventilator. Once you are breathing without the ventilator, these breathing treatments will require your active participation to help:

- 1) clear the mucus in your lungs,*
- 2) re-expand your lungs, and*
- 3) keep your blood oxygen saturation within normal limits. The following are the breathing treatments you are expected to do after surgery:*

Incentive Spirometry, “The Triflow”

This breathing treatment involves inhaling deeply through a mouthpiece that is attached to a clear plastic box containing three colored balls. The goal of this breathing treatment is to encourage deep inhaling that lifts all three of the balls. Your goal is to use the triflow ten times every hour while you are awake. By inhaling deeply while using the Triflow, you help to your lungs to expand normally. Even though you may have pain from the surgery, it is important that you take deep breaths.



PEP VALVE UNIT FOR HHN TREATMENT

Hand Held Nebulizer (HHN) with PEP valve

This breathing treatment uses a two-part device that helps your lungs in two ways.

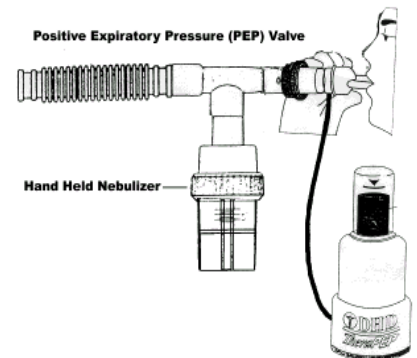
First, the hand-held nebulizer unit turns the bronchodilator medication ordered by your doctor into a mist that you can breathe deeply into your lungs. Once in your lungs, the bronchodilator opens your airways so that you breathe easier and can cough up mucus from your lungs.

Second, the PEP valve unit that is attached to the hand-held nebulizer (HHN) forces you to exhale through tiny openings in the PEP valve. Exhaling actively, but not forcefully, through the PEP valve openings does 3 things:

- 1. improves the distribution of the bronchodilator medication,*
- 2. helps remove the mucus from your airways, and,*
- 3. strengthens your breathing muscles.*

The goal of the PEP valve treatment is to generate a 10 to 20 cm H₂O pressure when you exhale, as indicated by keeping the PEP indicator within the two arrows. After you complete 10 to 20 breaths, you will “huff cough” to further clear your airways of any mucus. The PEP valve breaths & huff cough sequence is repeated until your ordered bronchodilator is gone. Your doctor wants you to have the HHN-PEP valve treatment a minimum of 4 times per day and as often as every four hours in the immediate post-operative period.

Your doctor may order a chest x-ray to see how well your lungs have expanded after the surgery.



... if you work together with the nurse and the respiratory therapist, we can help you continue to breathe on your own without the need for the ventilator

CHEST PHYSIOTHERAPY

This treatment is given with your HHN-PEP valve treatment to help loosen and clear mucus from the lungs. During this treatment, you will be positioned on your right and left sides. Having you on either side helps gravity drain the mucus from the small to larger airways. Your respiratory therapist will use a soft machine that vibrates your chest wall. Both the positioning and vibration help to loosen the mucus so that you can cough it up. Your doctor wants you to have this every 4 hours.



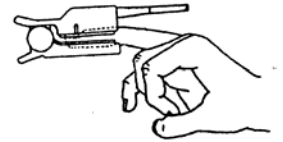
Please remember, if you work together with the nurse and the respiratory therapist, we can help you continue to breathe on your own without the need for the ventilator!

OXYGEN SATURATION PROBE (PULSE OX)

Throughout your hospital stay you will wear a probe on your finger or earlobe to measure the oxygen saturation in your blood. This information is helpful because it tells us how well your lungs are working.

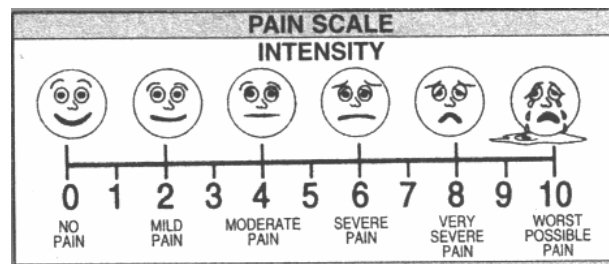
It is common that the blood oxygen saturation level drops for a short pe-

riod of time after surgery. You may receive extra breathing treatments, if needed, to help the blood oxygen saturation level return to within normal limits. This may include having these treatments during the night.



PAIN MANAGEMENT

Managing your pain is very important. For the first two or three days, you will have an epidural catheter in your back that gives you pain medication automatically. Your nurse will ask you to describe your pain on a scale of 1 (being the least) to 10 (being the worst).



Expect that all your caregivers will ask you to “rate your pain on a scale of 1 to 10”. This will help your caregivers know how well your pain is managed

and your need for additional medication. **Let your nurse know if you are uncomfortable and need additional pain medication.** We do not expect that all the pain will be taken away, but we do want to make you comfortable so that you are able to walk and take your breathing treatments in preparation for going home.

NUTRITION

After your breathing tube is removed, you may begin to sip liquids. Start slowly while your stomach adjusts. Once you can tolerate liquids, you will advance to more solid food. You will sit up in a chair for all meals!

You should concentrate on eating more each day, and focus upon foods that are high in protein. You may experience a loss of appetite. If you are unable to meet your caloric or protein requirements, your doctor will order milkshakes with protein to supplement your meals. Good nutrition is critical to your recovery since eating helps you to regain your physical strength, promotes wound healing, and enhances your ability to ward off infection. Therefore, it is important that you make every effort to eat your meals!



TIPS FOR INCREASING CALORIE AND PROTEIN INTAKE

Good nutrition is critical to your recovery since eating helps you to regain your physical strength, promotes wound healing, and enhances your ability to ward off infection.

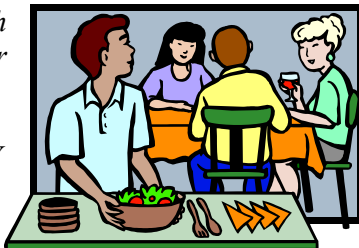
Tips for Increasing Your Calories

1. Add butter or margarine to vegetables, bread, pasta, rice, cereals, potatoes, casseroles, sandwiches, soups and pastries.
2. Use mayonnaise in salads, sandwiches, tuna, egg salad and chicken salad.
3. Peanut butter high in protein and calories, and cream cheese high in calories can be added to shakes; spread on bread, bananas, apples, celery and crackers.
4. Honey, sugar, jam, jelly, molasses and syrup can be added to beverages; spread on toast, waffles, pancakes; add to ice cream, cereal, yogurt and fruit.
5. Sour cream can be used on vegetables such as potatoes, beans and squash. Try serving it on fruit as a dressing.
6. Add whipped topping or whipped cream to desserts, hot chocolate, or use it un-whipped in soups and sauces. Mix it with milk and add to cereal and milkshakes.
7. Dried fruit, nuts and granola can be eaten as a snack, added to cereal, mixed with sour cream and yogurt, and sprinkled on ice cream or yogurt.
8. Use whole milk instead of nonfat or low-fat milk.

OTHER HELPFUL HINTS

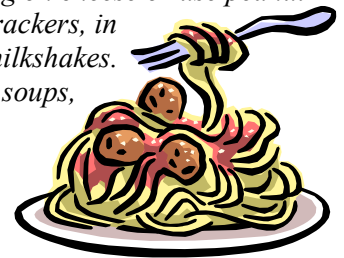
Is Your Appetite Poor?

1. Sit down and eat your meals at a table.
2. Try to have fresh air and sunlight in the room.
3. In the evenings, create atmosphere with dimmed lights or candle light.
4. Treat yourself to nice linens, plates and silverware.
5. Turn on your favorite music.
6. Dine with friends or during your favorite TV shows.



Tips for Increasing Protein

1. Nonfat dry milk can be added to soups, sauces, potatoes, milkshakes, scrambled eggs, omelettes, hot cereal, casseroles and in baked desserts.
2. Make a fortified milk by adding 2 tablespoons nonfat dry milk per cup of regular milk. Use this as a beverage or where a recipe calls for milk.
3. Use fortified milk instead of water in soups, hot cereals, cocoa mixes and puddings.
4. Choose desserts that contain egg and milk products such as pudding, tapioca, custard, bread and rice pudding.
5. Add hard cooked eggs, tuna and diced meat, poultry and seafood to salads, vegetable, rice and pasta.
6. Add grated cheese to salads, vegetables, rice, pasta, soups, casseroles, and on toast. Melt cheese in scrambled eggs.
7. Add nuts to ice cream, yogurt, muffins and salads.
8. Try snacking on cheese or use peanut butter on crackers, in yogurt or milkshakes.
9. Add tofu to soups, salads, and sauces.



Do You Fill Up Quickly?

1. Eat smaller meals more often. Try to eat 6 small meals per day. A small meal could be as simple as peanut butter on toast with a glass of regular milk.
2. Take small bites and chew slowly to avoid swallowing a lot of air.
3. Limit the amount of liquids you drink with meals. The liquids you do drink should be high in calories such as juice and whole milk.
4. Some people find that garlic, onion, broccoli, cauliflower, cabbage, brussel sprouts, raw peppers and melon cause gas and distention. Avoid foods that cause you problems.

ELIMINATION

When you return from surgery, you will have a foley catheter in place that will drain urine from your bladder. This catheter will be removed when the epidural catheter used to manage your pain is removed. You will then be able use the bathroom to urinate.

If by the second day after surgery, you have not move your bowels, your nurse will give you a laxative.

PHYSICAL THERAPY

On the day after your surgery, you will begin to do exercises with your physical therapist.

Your physical therapist has designed these exercises to increase the muscle strength and endurance in your arms and legs, which in turn also, increase your overall endurance/tolerance for day to day activities. On this same day, your nurse or physical therapist will mount the chest tube chambers and oxygen on a cart so that you may take a few steps around your room or in the ICU.

*Your physical therapist will continue to work with you throughout your stay in the hospital. Your physical therapy begins in the ICU and continues while you are out of the ICU. You will be trained on how to get in and out of bed or chair and will be trained and assisted in walking in the hallways several times a day with the help of your nurse and your physical therapist. **Walking is the most important thing you have to do to improve your lung function. Your physical therapist will assist you in increasing your walking distance to increase your endurance and improve your lung function.***

You will be asked to perform exercises of your arms and legs and rate yourself on level of shortness of breath with exercise and or walking, using a scale called Borg scale. The Borg scale is a rating scale of 0 to 10, which will represent your pulmonary (lung) response to exercise and or walking.

You will also be evaluated by occupational therapist. They will check your ability to do your daily activities and will educate you on how to conserve energy with your activities of daily living.

As you begin to increase your activity for example, getting out of bed, bathing, and walking in the hallway, your caregiver will ask you to rate your feelings of shortness of breath on the scale of 0 to 10, with 0 meaning no shortness of breath, and 10 meaning the maximal feelings of shortness of breath. This information tells us how hard you are working to breathe during exercise and or walking.



On the day after your surgery, you will begin to do exercises with your physical therapist.

0	=	Nothing at all
0.5	=	Very, very light
1	=	Very light (Just Noticeable)
2	=	Light
3	=	Moderate
4	=	Somewhat heavy
5	=	Heavy (Strong)
6	=	
7	=	Very heavy
8	=	
9	=	
10	=	Very, very heavy (Almost Maximal)
*	=	Maximal

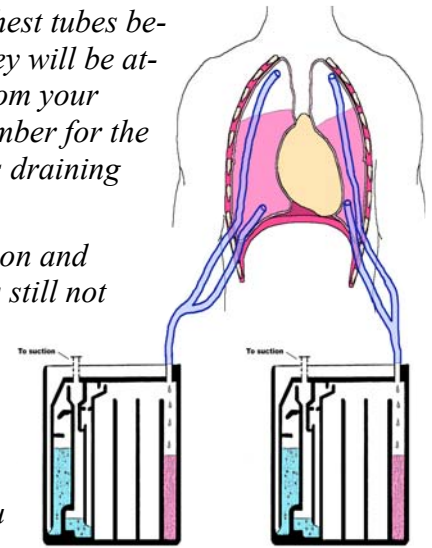
Borg scale is a rating scale of 0 to 10, which will represent your pulmonary response to exercise and/or walking.

CHEST TUBE(S)

During the surgery, your physician will place chest tubes between the ribs to help your lungs re-expand. They will be attached to a chamber to collect fluid drainage from your chest. Your nurse will frequently check this chamber for the presence of an air-leak and how well the fluid is draining from your surgery site.

... if you work together with the nurse and the respiratory therapist, we can help you continue to breathe on your own without the need for the ventilator!

Sometimes an "air leak" develops. This is common and means that the pleura (which covers the lung) is still not healed. As long as the air leak is present, the chest tube will stay in place and connected to the chamber. If it persists and your lung needs more time to heal an air leak, your doctor may disconnect the chest tube from the chamber and apply a Heimlich Valve to it. This will allow you to move about more freely while the air leak



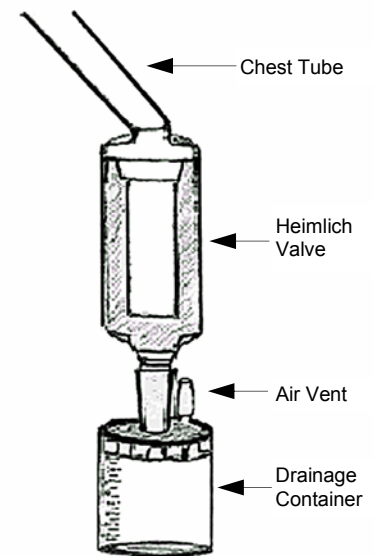
HEIMLICH VALVE

If your lung needs more time to heal, your chest tube will remain in place but attached to a Heimlich valve.

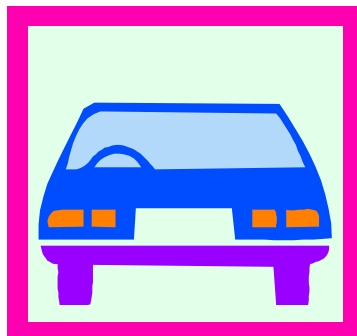
If you go home with a chest tube attached to the Heimlich Valve, this is how to care for it:

- 1) Make sure the chest tube is not kinked at any time. This will allow the air and drainage to escape from you lungs.
- 2) Always keep the air vent free and clear. This is what allows the trapped air from your lungs to escape.

Empty the drainage container when it is one half full. This will prevent it from overflowing and making a mess.



PREPARATION FOR DISCHARGE



You can expect to be in the hospital for 7 to 10 days after surgery. Your doctor will make the final decision as to exactly when you will be ready to go home. In preparation for discharge, your social worker will help you prepare for your needs at home and discuss these with you and your caretaker(s).