

# Breathstacking using a Lung Volume Recruitment bag

After a spinal cord injury, the muscles that help you breathe and cough can be weak. Breath stacking with the lung volume recruitment (LVR) bag helps you fill your lungs more than you can on your own. This creates a stronger cough and clears mucous from your lungs. Getting mucous out of your lungs helps prevent lung collapse and infections like pneumonia. Having a healthy lung volume improves oxygen, helps you speak louder, and reduces breathing problems.

## How Does Breath Stacking with the LVR Bag Work?

The LVR bag allows you to push air into your lungs to 'stack' several breaths on top of each other. This helps to fill your lungs with as much air as you can. It helps you reach your maximum lung capacity to produce a stronger cough. It also stretches your chest wall muscles to prevent stiffening.



**Breath stacking kit:** Bag, mask, nose plug, and either mouthpiece, facemask, or tracheostomy connector.

## When to Do Breath Stacking

It is best to do breathstacking with LVR bag before meals. Wait at least 1 hour after eating. This will help reduce the risk of nausea and possible vomiting.

Do NOT do it if you have any of these symptoms:

- Feel light-headed
- Upset stomach
- Chest discomfort
- Low blood pressure

**Contact your Respiratory Therapist for more information.**

**MEDICAL**

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If you feel very short of breath or are coughing up blood do not use the LVR bag and seek medical attention.

## How to Do Breath Stacking

Breath stacking should be done at least twice every day. Use the LVR bag more often if you are feeling congested or have more mucous than usual.

### Set Up

Always clean the mouthpiece with warm soapy water or an alcohol swab after each use. Breath stacking can bring up a lot of mucous that you need to spit out. Make sure you have a container into which you can spit.

Breath stacking is best when done sitting up but lying down is also okay. An assistant can help you squeeze the bag if needed.

### Part I: Breath Stacking

1. Sit upright and get comfortable in a bed or chair. If needed, put on a nose clip to help keep the air in your lungs.
2. Put the mouth-piece in your mouth. Hold it with your teeth and make a tight seal with your lips. If you prefer, you can use the mask instead. Always make sure you have a tight seal. Take a deep breath and hold it.
3. With air in your lungs, try to breathe in more air as you gently squeeze the bag. This will push extra air into your lungs and help them stretch.
4. Squeeze the bag 2 to 5 times until your lungs are completely full. Only gently squeeze the bag. Your lungs are full when the bag gets harder to squeeze. Do not squeeze the bag too much as this can cause damage to your lungs.
5. Hold your breath for 3 to 5 seconds.

### Part II: Exhale

1. Remove the mouth-piece and breathe out slowly or cough.

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2. If mucus is loosened, you might hear a rattling sound or feel congested. Cough out as much mucous as you can and spit it out into a container.

## Repeat

1. Repeat the whole process 3 to 5 times or until all the mucous is out. Rest in between cycles.

Clean mouthpiece (or facemask) after use.

**The LVR bag should only be used by those who are trained in and understand its use.**

## Getting a Stronger Cough: Manually Assisted Cough (MAC)

Sometimes it can be difficult to get a cough with enough force to remove mucous. You can ask an assistant to help you get a stronger cough. This is done by using a technique known as 'manually assisted cough'. If you are in a wheelchair, make sure the brakes are on. It is best if the back of the wheelchair is against a wall to avoid tipping. Start by filling your lungs by taking a big breath. You can use the LVR bag to help if you cannot take a deep breath on your own. Your assistant should be ready with their hands on your abdomen (see below). When you are ready to cough, your assistant helps you push. In ONE single motion, they should push up and in, towards your head. They do this at the same time as you cough. This can help you have a stronger cough and release mucous. Repeat as needed. If the push is not strong enough, mucus may not move out.

If an assistant is not around to help you cough, you may be able to assist yourself. Place your arms across your stomach. Push in and up when you cough or lean forward as you cough.

There are two places for an assistant to place their hands:

- **Hands under rib cage:** Fingers should be together. The heel of the palm is placed above the belly button and under the rib cage.

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- **Hands on side of rib cage:** Hands go on both sides on the lower part of the rib cage.



Doing breath stacking at least twice a day, every day, will support better breathing. This can reduce emergency visits to hospitals due to lung problems.

If you have any questions about using the LVR bag or manually assisted cough, please speak with your Respiratory therapist.

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