

FACT SHEET



# Multiple Sclerosis and Respiratory Muscle Weakness

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## Respiratory function is important to keep your body strong

- Neck and chest wall muscle strength is required to expand the chest wall to allow the lungs to expand when you breathe in. When the lungs fill with air, the blood vessels in the lungs absorb oxygen necessary for your body to function well. If the muscles that expand the chest wall are weak, the lungs cannot expand fully and less oxygen gets into our blood.
- Abdominal muscle strength is required to achieve a forceful cough necessary to remove mucus from the lungs when you have a respiratory infection. Also, abdominal muscle strength is needed for loudness and endurance of speech projection.

People with multiple sclerosis (MS) rarely complain of respiratory dysfunction, although upon testing respiratory dysfunction is commonly found even in people who have minimal disability.

## When Should Respiratory Muscle Strength be Tested?

If you have MS and experience difficulty breathing, shortness of breath, or have a weak cough on a regular basis, testing of respiratory muscle strength is indicated.

## How is Respiratory Muscle Strength Tested?

Respiratory therapists and physical therapists test respiratory muscle strength and endurance. Testing is done using a device called a manometer which measures air pressure as you breathe into or out of a large tube placed in your mouth.

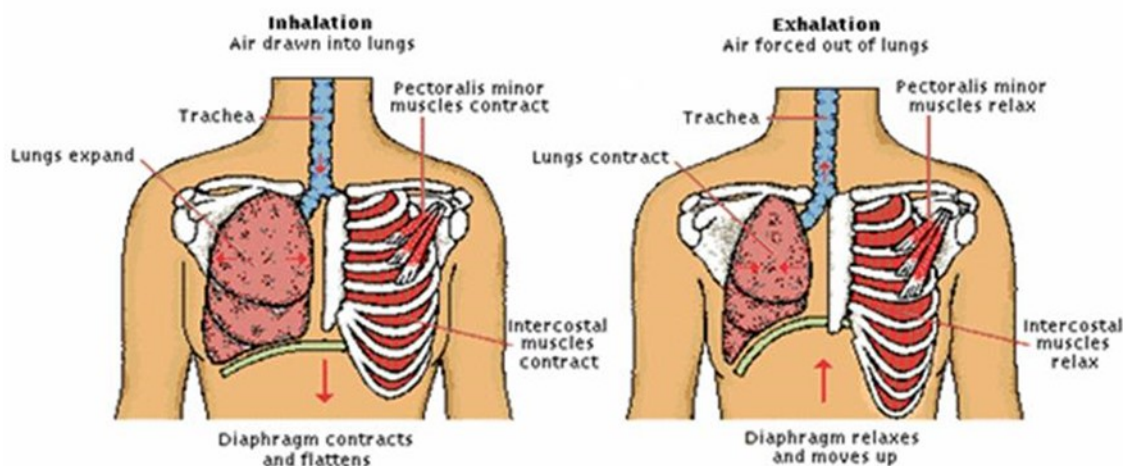


Image from (<http://www.powerbreathe.com/blog/inspiratory-muscle-training-for-strength>) Last accessed on 3/24/15



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### Strength measures:

- Maximal Inspiratory Pressure (MIP) is a measure of the maximal pressure generated in a testing device when breathing in (inspiration). Muscles that contribute to this measure include the accessory muscles of respiration found in the neck, external intercostal muscles and parasternal internal intercostal muscles found between the ribs, and the diaphragm.
- Maximal Expiratory Pressure (MEP) is a measure of the maximal pressure generated in a testing device when breathing out (expiration). Muscles that contribute to this measure include the internal intercostal muscles found between the ribs and the abdominal muscles.

### Endurance measure:

- Maximal Voluntary Ventilation (MVV) is a measure of the maximal amount of air that can be breathed in and out in one minute. Endurance is measured with a spirometer.

### ***How can Physical Therapy Help Improve Respiratory Muscle Strength and Endurance?***

Just like any other muscles in your body, the muscles of respiration can be effectively strengthened with resistance exercises. Your physical therapist can assist you in developing an appropriate exercise program that addresses:

- Selection of inspiratory or expiratory trainer. Resisted expiratory training is recommended if you have a weak cough. Resisted inspiratory training is recommended if you have shortness of breath or low oxygen levels in your blood.
- Resistance level needed. Many of the pressure load threshold trainers available commercially are designed to improve respiratory muscle strength in athletes and they offer too much resistance for most people with multiple sclerosis. A trainer offering low resistance such as the Threshold Inspiratory Muscle Trainer from Phillips®, a Powerbreathe (LR) Level I from Powerbreathe®, or a PowerLung Breatheaire® is recommended in most cases.
- Starting level of resistance and instruction on how to progress the resistance training.

Most respiratory muscle training programs take only 10 minutes/day to do, so it is easy to incorporate into your day. Inspiratory and expiratory training programs have been shown to be effective in people with MS at all levels of disability.



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### ***Benefits of Respiratory Muscle Strength Training***

- Increased respiratory muscle strength
- Increased respiratory muscle endurance
- Decreased fatigue
- May contribute to:
  - \* Improved balance
  - \* Improved walking endurance
  - \* Reduced respiratory infections and/or greater ability to recover from respiratory infections

### **References**

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