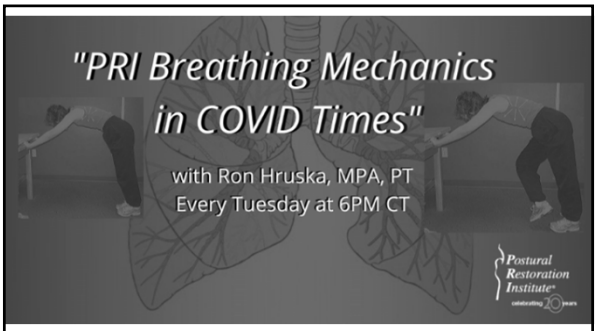

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WEEK 5:
MANAGING CHRONIC OBSTRUCTIVE LUNG DYSFUNCTION

Characteristics of Chronic Airflow Obstruction (Hyperinflation)

1. Paradoxical inspiratory ‘indrawing’ of the lateral rib margins.

2. Incoordination of abdominal motion.

3. Paradoxical inspiratory indrawing of the ribcage in the antero-posterior dimension.

4. Decreased lower lateral ribcage motion.

5. A reduction in tidal abdominal displacement. The flattened diaphragm position reduces forward displacement of the abdominal content.

Abdominal contents serve as a fulcrum for the two central tendons at rest for normal tidal volume breathing.

Tidal volume is the normal volume of air displaced between normal inhalation and exhalation when extra effort is not applied.

In a young human adult, tidal volume is approximately 500 ml per inspiration.

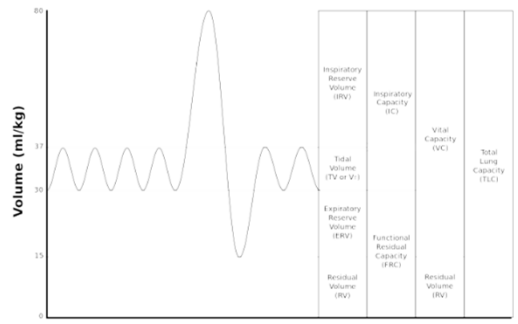


Image from: https://en.wikipedia.org/wiki/Tidal_volume

Forced vital capacity (FVC) is the amount of air that can be forcibly exhaled from your lungs after taking the deepest breath possible, as measured by a spirometer.

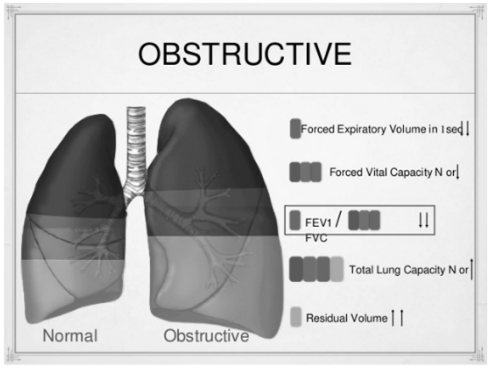


Image from: https://www.slideshare.net/FatimaAwadh/obstructive-vs-restrictive

Although this test may help distinguish obstructive lung disease, such as asthma and COPD, from restrictive lung diseases, such as pulmonary fibrosis or sarcoidosis, it is a very valuable tool to assist in demonstrating improvement in lung obstruction, immediately after treatment procedures for chronic airflow obstruction.

When functioning with a limited zone of apposition (ZOA) on one or both sides, the reading on an exhalation spirometer can be greater than normative values because a persistent state of hyperinflation leaves high levels of air which has not been exhaled in the lungs at rest.

After restoring a ZOA on one or both sides, the reading on an initial exhalation spirometer can be less than normative values, because the rib cage is beginning to function in a state of more normal internal rotation at rest (un-obstructed), and has less volume of available air for exhalation.

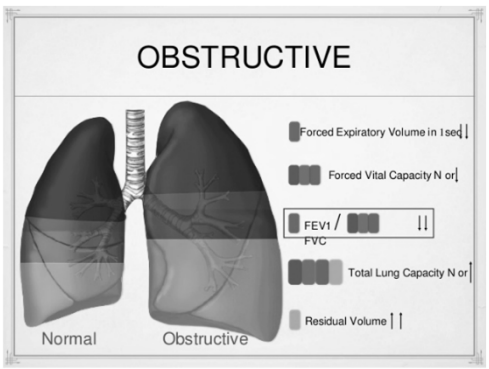
The Most Common Contributions of Chronic Airflow Obstruction

1. Lateral ribcage paradox caused by diaphragmatic contraction because of the abnormal orientation of the fibers in the overinflated chest.

2. Abdominal muscle relaxation at the onset of inspiration, secondary to overactive psoas and paravertebral contraction at the early onset of inspiration.

3. Increased functional residual capacity (FRC) and overuse of accessory inspiratory muscle in ‘attempt’ to overcome external resistance load (lateral chest wall obstruction) at end-expiratory phase.

Functional residual capacity (FRC) is the resting volume at which the elastic recoil pressure of the lung inward equals the elastic recoil pressure of the chest wall outward, and the alveolar and mouth pressure are both zero and there is no airflow.



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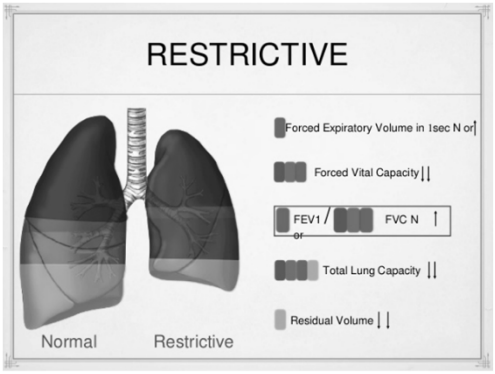


Image from: https://www.slideshare.net/FatimaAwadh/obstructive-vs-restrictive

4. Increased O_2 in the blood due to a decrease in CO_2 in the blood and lungs.

5. Loss of costal diaphragmatic fiber function (ZOA) with upward elevation of anterior ribs.

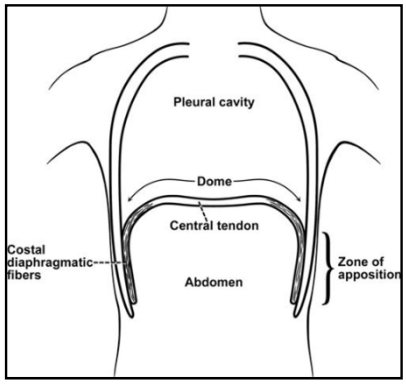


Image from: DeTroyer A, Wilson TA. Action of the diaphragm on the rib cage. J Appl Physiol. Aug 2016; 121:391-400.

6. Forward head postural movement.

Forward head postural movement associated with chronic obstructive airflow contributes to pharyngeal, velopharyngeal and oropharyngeal airway shape.

When abdominal contents move up into the thorax (loss of ZOA) lung tidal volume decreases.

Therefore, the tension within the walls of the upper airway decrease, increasing upper airway susceptibility to collapse.

Individuals with chronic obstructive lung dysfunction have upper airway ellipses oriented antero-posteriorly, making the lateral pharyngeal walls more susceptible to collapse.

Whereas, individuals without obstructive lung dysfunction, the long axis of the ellipse is oriented transversely.

The following PRI techniques selected for this webinar should reduce obstructive lung dysfunction because of foot/floor and shoulder/hand positional interaction during reaching and respiration.

Standing Wall Supported Resisted Ischial Femoral Ligamentous Stretch


Let's begin with the title of this PRI Non-Manual Technique.

You will need to purchase approximately 5 to 7 feet of medium resistant therapeutic tubing. You can find information on the PRI Website under "Products" (and then click on "Materials") and purchase from Stretch Well, green colored medium elastic tubing.

However, you can perform this activity without band resistance, by placing your hands on the edge of a chair that easily slides forward as you reach forward.

You will also need to find a book that is approximately 1 to 3 inches in height, at least 12 inches long and 7 to 10 inches deep.

When performing this activity in “standing” you will be able to use the floor as an anchor and a “wall” as “support” for distraction of your lower and upper posterior chest walls.

[This position on the floor and on the wall will allow you to primarily sense and focus on mid to low back lengthening as the accompanying posterior and lateral chest walls expand].

Therefore, the floor you are “standing” on, the “wall” your low back and hips are resting on, and the bands that are looped around the hands or the friction from the legs of the chair the hands are resting and pushing forward on, are all providing the forces needed for your left and right diaphragm leaflets, inside your two respective chest chambers, to open and expand and stretch both the inside and outside chest walls.

This expansion, under the above guided resistance, allows one chest chamber to ideally open better when closure of the other chest chamber occurs, and vice versa.

This PRI Chest Wall technique, minimizes pulmonary or lung static function, maximizes elastic tissue recoil of the chest walls, equalizes pressure when all four extremities are alternating or involved with lifting, and assists with optimizing immune responses.

Step 5, is where the magic happens.

The magic is when your inhalation effort through your nose, after performing Step 4, continues to open up the entire chest wall cavities on both sides, along with all the underlying alveolar tissue in your lungs.

Standing Wall and Chair Supported Reach

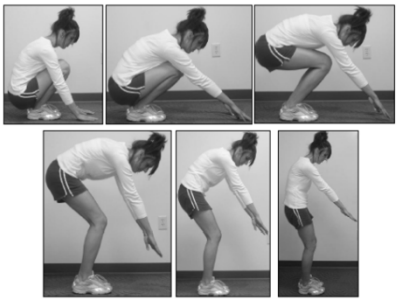
Step 3: Bring your arms out in front of you as you round out your back, performing a pelvic tilt so your lower back (mid-back and down) is flat on the wall.

- ✓ By placing your 'arms out in front of you', you are separating the shoulder from the chest wall which assists in the normalizing of FVC and FRC.

Step 4: Keeping your lower back against the wall, reach forward and place your hands on a moveable surface (rolling chair or stool).

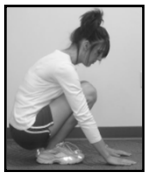
- ✓ Keeping your low back or posterior hips against the wall and placing your outstretched hands on a moveable surface, the floor becomes a force that reduces the positional obstructive lung dysfunction upon inhalation effort of Step 5 and Step 6.

Reverse Squatting



This technique requires un-obstructed movement of the midback and lung by keeping the knees flexed during the time the back is reversing as the hands are reaching.

This requires significant postural control from the feet and ankles to increase FVC at Step 2, at end range of exhalation;



And from the shoulder blades to decrease FRC at Steps 3 to 5, at the end range of inhalation.

THANK YOU!

We hope you will join us again next week!

WEEK 6:
INTERNAL OBLIQUE ABDOMINAL INFLUENCES ON EXTERNAL ROTATED RIB AIRFLOW OBSTRUCTION