

# The Effect of Jacobson's Relaxation Therapy on Shortness of Breath In Patients With Bronchitis Chronic

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## Abstract

Lower respiratory tract infections are a serious public health problem in Indonesia. In 2007, the number of people infected with bronchitis is about 1.6 million people and the prevalence has not changed significantly since then. Several therapeutic techniques have been developed to resolve the problems related to chronic bronchitis, including relaxation therapy to decrease shortness of breath. This study was conducted on 13 patients with chronic bronchitis who were given Jacobson's Relaxation Therapy for 25—30 minutes with frequency three times a week and performed for four weeks. The degree of shortness of breath was measured using Borg Scale before and after the treatment of Jacobson's relaxation therapy. In average, subjects endured shortness of breath with a degree of 2.69 before treatment, and decreased to 0.77 after the treatment. Wilcoxon signed-rank test obtained p value = 0.001, which means the effect of Jacobson's relaxation therapy on the degree of shortness of breath.

**Keywords:** Shortness of breath, Chronic Bronchitis, Jacobson's Relaxation

## 1. Introduction

In developing countries, e.g. Indonesia, lower respiratory tract infections still become serious health problem. In Southeast Asia, an estimated prevalence of COPD is 6.3% with the highest prevalence in Vietnam (6.7%) and RRC (6.5%). WHO has reported COPD is the fourth leading cause of death in the world. It is estimated to cause the death of 2.75 million people or approximately 4.8% of all death (Nickel et al., 2005).

The number of people suffering from bronchitis is about 1.6 million people in 2007 and it insignificantly change since then. In the same year, the number of children diagnosed with bronchitis in the United States was 7.6 million. According to the American Academy of Family Physicians, over 90% of bronchitis patients have a history of smoking. Prevalence of tobacco consumption in Indonesia, both smoking and chewing tobacco, among people aged 15 years and over continually increase in the last 20 years. The increase of consumption is followed by the increase in Chronic Obstructive Pulmonary Disease (COPD). Reports of National Basic Health Research in 2013 showed the prevalence of tobacco smokers was 56.7% of men and 1.9% of women. The highest prevalence of male smokers was found in Gorontalo, while the largest prevalence of female smokers was in Papua (*Badan Penelitian dan Pengembangan Kesehatan*, 2013)

Chronic bronchitis is a respiratory tract disorder with productive chronic cough occurs at least 3 months of the year and for at least two consecutive years, and other diseases are excluded (PDPI, 2003). The secretions that accumulate in the bronchioles interfere with effective breathing. Smoking or pollution exposure is a major cause of chronic bronchitis. Patients with chronic bronchitis are more susceptible to recurrence of lower respiratory infections. The range of viral, bacterial, and mycoplasma infections may cause episodes of acute bronchitis. Exacerbation of chronic bronchitis is almost certain during the winter. Inhaling cold air can cause bronchospasm for those who are vulnerable (Hinkle, Janice & Cheever, 2013).

Bronchial structural changes in bronchitis are caused by the destruction of elastic elements and bronchial smooth muscles. Generally, the affected Bronchus is a small bronchus (medium size), while large bronchi are rare. It can transmit air to the lungs and can damage it. Sutoyo (2009) described the changes in the structure of the respiratory tract causing physiological changes that are characteristic of chronic bronchitis, such as chronic cough, sputum production, airway obstruction, gas flow disturbance, pulmonary and cor pulmonary hypertension.

The pathophysiologic mechanisms of chronic bronchitis are complex. Toxic stimulation of the airway raises four major things, namely airway inflammation, mucous hypersecretion, ciliary dysfunction and reflex stimulation. In general, the cause of bronchitis is divided into two factors, namely environmental factors and host factors. Causes based on environmental factors include viral infections (influenza virus, parainfluenza viruses, respiratory syncytial virus (RSV), bacterial infections (Bordatella pertussis, Bordatella parapertussis, Haemophilus influenzae, Streptococcus pneumoniae, or atypical bacteria), fungi, and noninfectives (air pollution, cigarettes, and others). Meanwhile, the host factors include age, gender, allergic conditions and history of existing lung disease. The most common cause of acute bronchitis is viral infections of as much as 90% while bacterial infections are only about <10%.

The major defect in the bronchi is hypertrophy of the mucus gland, which causes narrowing bronchial tubes and results in thickening bronchial diameter by more than 30-40% of normal. There is also diffuse inflammation in addition to mononuclear cells in the submucosa of the bronchial tracheo, metaplasia of the bronchial epithelium and reduced cilia. Furthermore, there is a change in the small airway that is goblet cell secretion, not only increases in numbers but also more viscous to produce a substance that mucopurulent, inflammatory cells in the mucosa and submucosa, edema, peribronchial fibrosis, intraluminal mucus blockage and the addition of smooth muscle. Excessive and thick secretion of mucus will cover the cilia, because the layer of phlegm covering the cilia, so cilia cannot afford to push the sputum upwards and the sputum will accumulate in the airway. Excessive mucus production leads to the occurrence of infection and slows down the healing process. This is a circle with the result of hypersecretion.

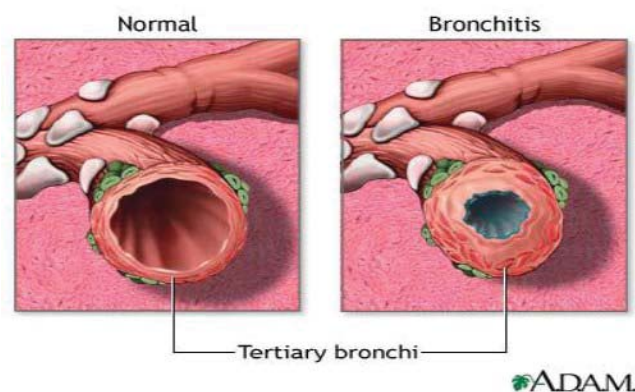


Fig. 1. Figures of normal bronchi and bronchitis.

Common symptoms of chronic bronchitis are cough and excessive production of sputum, dyspnea (shortness of breath), fatigue, and fever. Cough and excessive production of sputum are the most common signs and symptoms. Sputum is usually clear, white or yellowish green in color. Dyspnea (shortness of breath) gradually increases in line with the severity of the disease. Generally, people with chronic bronchitis experience shortness of breath and cough

during their activities. Symptoms of fatigue, sore throat, muscle aches, nasal congestion, and headaches may accompany the main symptoms, while fever may indicate a secondary lung or viral infection of bacteria.

Chronic bronchitis is often associated with acute exacerbation symptoms in which the patient's condition worsens from previous condition and can be classified acute. This acute exacerbation is characterized by typical symptoms, such as severe shortness of breath, productive cough with changes in volume or purulence of sputum, or may also be accompanied by unnatural symptoms, i.e. malaise, fatigue and sleep disorders. Clinical symptoms of chronic bronchitis with acute exacerbations are divided into respiratory symptoms and systemic symptoms. Respiratory symptoms include increasingly severe breathlessness, increased volume and sputum purulence, an increasingly frequent cough, and shallow and rapid breathing. Systemic symptoms are characterized by elevated body temperature, increased pulse rate and mental state disorder (PDPI, 2003).

Several therapeutic techniques have been developed to address the problems of chronic bronchitis, including relaxation therapy to decrease shortness of breath in patients with chronic bronchitis. Jacobson's relaxation is a relaxation method that is easy to learn and can be done on a regular basis. This method was developed by Jacobson and Wolpe to reduce tension and anxiety. In 1938, Jacobson's introduced a progressive relaxation technique in which one can learn to monitor and control muscle tension. Jacobson's progressive relaxation technique involves muscle contraction and relaxation that makes people feel more at ease. They will automatically relax their muscle after contracting the muscle group. If a person is in a relaxed state, there will be a reduction in the reaction to emotion, both to the central nervous system and to the autonomic nervous system which can further enhance the feeling of fresh and healthy, both physically and spiritually. Jacobson's explains the things that people do when tense and relaxed, which at times the body and mind relax, automatically the tension that often makes the muscles tightened will be ignored (Jarasiunaite, Perminas, Gustainiene, Peciuliene, & Kavaliauskaite-Keserauskiene, 2015).

Jacobson's relaxation technique involves 16 muscle groups. The muscle groups are right-handed groups including dextra forearm, biceps dextra, left-sided hand covering the left forearm, biceps sinistra, upper cheeks and nose, lower cheeks and nose, neck and throat, chest, shoulder, trunk, abdominal, right legs include hip dextra, dextra calf, left leg covering the left hip, the left calf (Y, Li et al., 2015). This relaxation technique is carried out in a comfortable position with a supine lying pillowed position. First, perform deep breathing as many as three times. Next, relaxation movements are carried out beginning with the usual movement then increasing the strength according to one's ability. Every movement is done for 6—10 seconds then stop and relax.

Jacobson's relaxation technique is one of self-management techniques based on the workings of the autonomic nervous system, the sympathetic and parasympathetic nerves. In addition, after the muscles relax, the organs will return to normal. Those who perform relaxation techniques can help their body to be relaxed, so as to improve various aspects of their physical health (Resti, 2014). This technique has proven to be an effective and inexpensive alternative therapy for asthmatics. With this progressive muscle relaxation technique, systolic blood pressure in asthma can be lowered, and FEV1 may be increased (Nickel et al., 2005).

This study aimed to determine the effect of Jacobson's relaxation therapy to reduce shortness of breath on patients with chronic bronchitis.

## 2. Method

This research was a pre-experimental research with pre-test and post-test design. It was conducted on 13 patients with chronic bronchitis aged 40 - 79 years, at the Center for Community Lung Health (BBKPM) Surakarta. Jacobson's relaxation therapy was performed for 25—30 minutes at each session, the frequency was three times a week and for four weeks. The subject was measured in shortness of breath with Borg Scale before and after Jacobson's relaxation therapy. The data obtained were then analyzed by Wilcoxon Signed-Rank Test to determine the degree of shortness of breath before and after the treatment of Jacobson's Relaxation therapy.

## 3. Results and Discussion

Table 1. Characteristics of Subjects

Characteristics	
Age (year)	57 ± 8.38
<b>Occupation</b>	
Farmer	6
Labor	3
Housewife	2
Entrepreneur	1
Retired civil servants	1
<b>Gender</b>	
Male	8
Female	5
<b>Smoking History</b>	
Active smoker	8
Passive smoker	3
Non smoker	2

The subjects were including 8 (eight) male and 5 (five) female patients with chronic bronchitis in BBKPM Surakarta. The average age of the subjects was 57 years old with minimum age of 40 years and maximum of 70 years. The occupations of subjects varied, i.e. farmer, labor, housewife, self-employed, and retired.

Table 2. Level of Shortness of Breath (Borg Scale)

	Pre Test	Post Test
Minimum	2.00	0.50
Maximum	3.00	2.00
Mean	2.69	0.77
Standard Deviation (SD)	0.48	0.43

The examination of shortness of breath with Borg Scale showed it does not too high value. In general, subjects complained the symptom of shortness of breath with a degree of 2.69 before treatment and decreased to 0.77 after therapy. Although the degree was less significant, it can still be measured.

Table 3. Wilcoxon Signed-Rank Test

	N	Average degree of shortness of breath		Difference	p
		<i>Pre test</i>	<i>Post test</i>		
Jacobson's Relaxation	13	2.69	0.77	1.92	0.001

The average degree of shortness of breath in the pre test was 2.69 (low shortness of breath) and the post test was 0.77 (very low shortness of breath). Based on Wilcoxon Signed-Rank Test, the  $p$  value = 0.001, which means that there is effect of Jacobson's Relaxation Therapy on the degree of shortness of breath. The results confirmed research conducted by Singh et al., (2009), in which Jacobson's Relaxation Therapy effectively reduces shortness of breath in two sessions on patients with COPD in the hospital after medical stabilization (Singh, Rao, Prem, Rc, & K, 2009). Jacobson's relaxation occurs due to repeated contraction and relaxation of different muscle groups. Jacobson mentioned that the reduced expenditure of motor neurons and proprioceptive infusion is the basis of relaxation. He also added that relaxation occurs as a result of decreased afferent and efferent activity in the motor nervous system, autonomic nerves, and cortical arousal levels or cortical excitability levels. Thus, Jacobson's Relaxation has a beneficial effect for psychological disorders and emotional disturbances involving autonomous and cortical structures.

Physiologically, relaxation occurs through the body's analgesic system. Relaxation has a natural body analgesic effect through endorphins. Endorphin hormones are associated with happy sensations. When the hormone endorphins are released by the brain, pain in the body will decrease with increasing pain threshold and activation of the parasympathetic system to relax the body and lower blood pressure, breathing and heart rate. The mechanism proves that relaxation can improve a person's ability to relax and reduce muscle tension. This relaxation also aims to control the cognitive of the central nervous system of a person to be able to feel and recognize if there is increased stimulation and excessive muscle activity (Singh et al., 2009).

Shortness of breath in patients with chronic bronchitis is very complex causes, not only because of changes in respiratory physiology, but also due to psychological disorders that accompany it. Patients with chronic bronchitis experience problems for a long time and frequently accompanied by prolonged anxiety, even depression. Anxiety and emotions will stimulate the emergence of respiratory disorders in the form of rapid breathing, which actually adds further severe complaints of patients with bronchitis. Other causes of shortness of breath are hyperinflation, hyperventilation, hypoxemia, hypercapnia, increased respiratory work, respiratory muscle weakness, deconditioning, depression, anxiety, and fatigue (Cafarella, Effing, Usmani, & Frith, 2012).

With Jacobson's relaxation therapy, the shortness of breath can be reduced by the mechanism of reducing the patient's psychological burden. It reaffirms Lolak, et al., (2008) stating progressive muscle relaxation method (Jacobson's) can reduce the psychological pressure in COPD patients (Lolak, Connors, Sheridan, & Wise, 2008). Other studies have suggested that oxygen saturation improves during the use of relaxation methods in patients with COPD. Progressive muscle relaxation techniques can also help reducing stress levels and stress



symptoms of asthma patients (Resti, 2014), and can improve sleep quality by increasing sleep duration in the elderly who have insomnia (Sulidah, Yamin, & Susanti, 2016).

Jacobson's progressive muscle relaxation is a skill that can be practiced and used to reduce or eliminate tension. This progressive muscle relaxation is used to fight anxiety, stress, or tension. By stretching and relaxing some muscle groups and distinguishing between tense and relaxed sensations, one can relax. The main purpose of relaxation techniques is to resist the formation of stress responses, especially in the nervous system and hormones. Ultimately, relaxation techniques can prevent or minimize physical symptoms due to stress when the body excessively works.

Jacobson's Relaxation is a combination of breathing exercises, contraction and muscle relaxation to produce a relaxing effect. Among non-pharmacological interventions, deep breathing and relaxation exercises, e.g. Jacobson's Relaxation, have been found to be effective in treating patients with Chronic Obstructive Lung Disease (Singh et al., 2009). Relaxation can reduce subjective tension and affect other physiological processes. Muscle relaxation goes along with the autonomic response of the parasympathetic nerves and muscle relaxation goes along with mental relaxation. Subjective anxiety can be reduced or eliminated by indirect suggestion or can eliminate the autonomic component of the feeling.

The breathing exercises that follow Jacobson's Relaxation are helpful for stress and shortness of breath. When inhaling, the air is inhaled inward through the nose and warmed to the nasal cavity mucous membrane. A slow breathing pattern has a role in improving the strength of the diaphragm. Performing abdominal breathing is also able to reduce the amount of hyperinflation or air traps in the lungs, which is common in people with asthma (Courtney & Cohen, 2008).

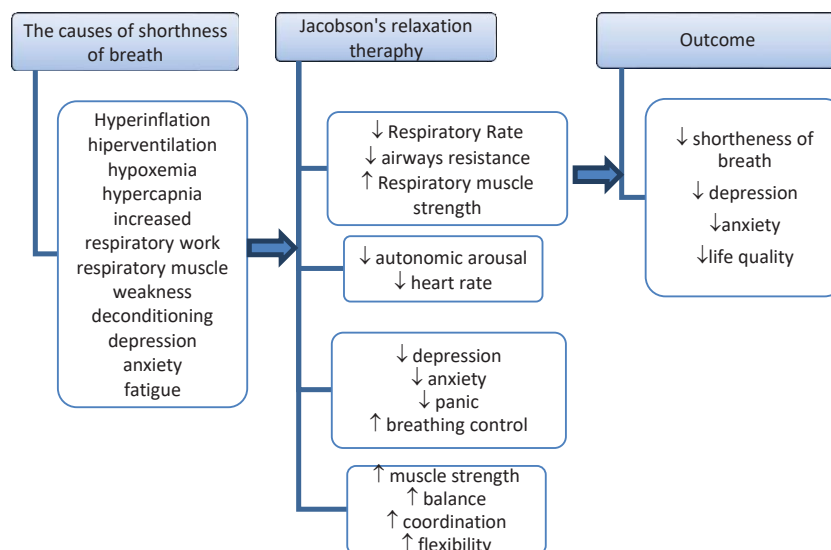


Fig. 2. The mechanism of decreased shortness of breath with relaxation.

#### 4. Conclusion

Jacobson's Relaxation Therapy performed for 25—30 minutes at each session, the frequency was three times a week and performed for 4 (four) weeks to lower the shortness of breath in patients with chronic bronchitis. Furthermore, subsequent research is required by selecting subjects with high degree of breathlessness and comparing it with other therapies.

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