

# The Role of Chest Physiotherapy on Stroke Patients: A Narrative Review

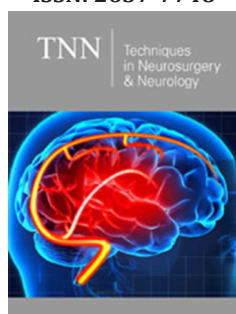
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## Abstract

This narrative review provides an overview of the role of Chest Physiotherapy (CPT) techniques in stroke patients. Stroke is a leading cause of long-term disability, and respiratory complications are common in stroke patients. CPT techniques are effective interventions for improving respiratory function, preventing respiratory complications, and facilitating mucus clearance in stroke patients. The review includes a comprehensive overview of various CPT techniques, their mechanism of action, and their immediate and long-term effects on stroke patients' respiratory function. The review also discusses the limitations associated with the use of CPT techniques, including patient cooperation and tolerance, timing and frequency, expertise and training, and individual variations in stroke patients. The findings suggest that CPT techniques such as chest vibration, percussion, postural drainage, breathing exercises and coughing techniques have positive impacts on lung function, oxygen saturation and mucus clearance in stroke patients. Immediate effects of CPT techniques can improve the patient's ability to breathe, reduce respiratory distress, and prevent respiratory complications. Furthermore, the use of CPT techniques can improve the patient's overall quality of life, reduce the length of hospital stay and decrease the cost of care. In conclusion, CPT techniques should be considered an important component of the rehabilitation program for stroke patients to improve their respiratory function and prevent respiratory complications. Careful consideration of the limitations associated with the use of CPT techniques is necessary to optimize their use in stroke patients and maximize their effectiveness. Further research is needed to investigate the long-term effects of CPT techniques on stroke patients' respiratory function and rehabilitation outcomes. This narrative review provides valuable insights into the role of CPT techniques in stroke patients and can inform clinical decision-making in the management of stroke patients.

**Keywords:** Chest physiotherapy; Stroke patients; Chest vibration; Percussion; Postural drainage; Breathing exercise

## Introduction

Stroke is a neurological disease that affects millions of people worldwide. It is caused by the interruption of blood flow to the brain, either from a blockage or bleeding. This leads to the death of brain cells and can cause a variety of physical, cognitive and emotional symptoms. There are two types of strokes: ischemic and hemorrhagic. An ischemic stroke occurs when a blood clot blocks a blood vessel in the brain, preventing blood flow and oxygen from reaching the affected area [1-3]. A hemorrhagic stroke occurs when a blood vessel in the brain ruptures, causing bleeding in the brain and damage to surrounding tissue. Both types of strokes can cause severe and long-lasting neurological deficits.

Symptoms of a stroke can vary depending on the location and severity of the brain injury. Common physical symptoms include weakness or paralysis on one side of the body, problems with coordination and balance and difficulty speaking or understanding language. Cognitive symptoms can include memory loss, confusion and difficulty in problem-solving and decision-making. Emotional symptoms can include depression, anxiety and mood swings. Strokes are a leading cause of long-term disability and can significantly impact a person's quality of life.

Stroke survivors often require long-term care and rehabilitation to manage their symptoms and regain their independence. Treatment for a stroke can include medication, surgery and rehabilitation therapies such as physical therapy, occupational therapy and speech therapy. Prevention is key to reducing the incidence of stroke. Risk factors for stroke include high blood pressure, high cholesterol, smoking, diabetes and obesity. Lifestyle changes such as eating a healthy diet, getting regular exercise, and quitting smoking can significantly reduce the risk of stroke. Early intervention and timely treatment can also improve the chances of recovery and reduce the severity of symptoms [4-8].

### **The role of CPTs on the stroke patients**

Stroke is a leading cause of disability worldwide and can lead to various complications, including respiratory diseases such as pneumonia, atelectasis and bronchitis. Chest Physiotherapy (CPT) is a well-known intervention used to improve lung function, prevent respiratory complications, and facilitate secretion clearance in stroke patients. CPT includes various techniques such as chest vibration, percussion, postural drainage, breathing exercises, and coughing techniques aimed at improving lung function, oxygen saturation, and mucus clearance [8-13]. CPT techniques have been found to have a positive impact on respiratory function in stroke patients. Chest vibration and postural drainage have been found to improve oxygen saturation and respiratory rate in stroke patients compared to controls. Percussion and vibration techniques were also shown to be effective in improving peak expiratory flow rate, forced vital capacity and Forced Expiratory Volume In One Second (FEV1) in stroke patients. Breathing exercises and coughing techniques have been found to significantly improve lung function in stroke patients.

CPT techniques work by mobilizing mucus in the airways, facilitating its clearance and preventing airway complications. Chest vibration and percussion techniques create oscillating movements and vibrations that help loosen and mobilize mucus in the airways. In postural drainage, the patient is placed in specific postures to facilitate the drainage of mucus from different segments of the lungs. Breathing techniques such as diaphragmatic breathing and incentive spirometry help expand the lungs, increase oxygenation, and improve lung function. Coughing techniques such as wheezing and forced exhalation make it easier to clear mucus from the airways while coughing. The use of CPT techniques in stroke patients can also improve their overall quality of life. By improving respiratory function, stroke victims can reduce the risk of respiratory complications and hospitalization, allowing them to remain independent and participate in daily activities. CPT techniques can also reduce the risk of stroke-related pneumonia, which is a leading cause of morbidity and mortality in stroke patients [14].

### **Different types of CPTs**

Chest Physical Therapy (CPT) is a widely used intervention aimed at improving lung function and preventing respiratory complications by facilitating mucus clearance in patients with lung

diseases such as stroke, Chronic Obstructive Pulmonary Disease (COPD), cystic fibrosis and pneumonia. There are three main types of CPT techniques: airway clearance techniques, breathing techniques and coughing techniques. Airway clearance techniques include chest vibration, percussion and postural drainage. Chest vibration involves the application of manual pressure or the use of a mechanical device to create oscillating movements across the chest wall. The vibrations generated during chest vibration help loosen and mobilize mucus in the airways, making it easier to clear [15]. Percussion, on the other hand, involves rhythmic clapping or hitting the chest wall with a cupped hand or mechanical device. The vibrations generated during percussion help loosen mucus in the airways and make it easier to expectorate. In postural drainage, the patient is placed in specific postures to facilitate the drainage of mucus from different segments of the lungs. The therapist chooses the pose based on the location of the phlegm in the lungs, and the patient is asked to cough to clear the phlegm.

Breathing techniques aim to improve lung function and oxygenation. These techniques include diaphragmatic breathing and stimulus spirometry. Diaphragmatic breathing involves taking deep breaths through the diaphragm muscle. This technique helps expand the lungs, increase oxygenation and improve lung function. Incentive spirometry is a technique that uses a device that provides visual feedback to encourage the patient to take deep breaths. This technique helps improve lung function and prevent respiratory complications such as atelectasis [16].

Coughing techniques are aimed at facilitating the removal of mucus from the airways. These techniques include wheezing, forced exhalation and coughing. Snorting involves exhaling forcefully with the mouth open, which helps move mucus in the airways toward the mouth, making it easier to cough up. The forced exhalation technique involves exhaling forcefully with the mouth closed, which helps increase pressure in the lungs and airways and makes it easier to cough up phlegm. Coughing is a natural reflex that helps clear the airways. However, in patients with lung disease, coughing may not be effective at clearing phlegm. Therefore, techniques such as huffing and the forced exhalation technique are used to facilitate mucus removal while coughing.

### **Outcomes associated with the CPTs in stroke patients**

Chest Physiotherapy (CPT) is a well-known intervention used to improve lung function, prevent respiratory complications, and facilitate secretion clearance in stroke patients. CPT techniques can have a positive impact on the respiratory function of stroke patients, leading to various outcomes related to the improvement of their health status [17-23].

### **Improvement in lung function**

CPT techniques can significantly improve lung function in stroke patients. Several studies have shown that CPT techniques such as chest vibration, percussion, postural drainage, breathing exercises and coughing techniques can improve peak expiratory flow rate, forced vital capacity, Forced Expiratory Volume In One Second (FEV1), and oxygen saturation in stroke patients. Improving

lung function can reduce the risk of respiratory complications and hospitalizations, allowing stroke victims to remain independent and participate in daily activities.

### Prevention of respiratory complications

CPT techniques can prevent respiratory complications in stroke patients. Stroke victims are at greater risk of developing respiratory complications such as pneumonia, atelectasis and bronchitis due to weakened respiratory muscles and limited mobility. CPT techniques such as chest vibration, percussion, postural drainage, breathing exercises, and coughing techniques can facilitate phlegm clearance and prevent secretions from accumulating in the airways, reducing the risk of respiratory complications and hospitalizations.

### Improved quality of life

CPT techniques can improve the overall quality of life of stroke patients. By improving respiratory function and preventing respiratory complications, stroke victims can remain independent and participate in daily activities, improving their physical, cognitive and emotional well-being. CPT techniques can also reduce the risk of stroke-related pneumonia, which is a leading cause of morbidity and mortality in stroke patients.

### Reduced length of hospital stay

CPT techniques can shorten the length of hospital stay for stroke patients. By improving respiratory function and preventing respiratory complications, stroke patients may require fewer hospital stays and medical interventions, reducing the burden on the healthcare system and the cost of care.

### Limitations associated with the CPTs in stroke patients

Although Chest Physical Therapy (CPT) techniques have been shown to have beneficial effects on respiratory function in stroke patients, there are also limitations associated with their use. Patient cooperation and tolerance can be challenging in stroke patients with cognitive and communicative deficits, limiting the effectiveness of CPT techniques. Additionally, the timing and frequency of CPT techniques in stroke patients may be limited by their health status and physical impairments, as certain positioning and movements may be difficult and uncomfortable for stroke patients with limited mobility and range of motion. The effectiveness of CPT techniques also depends on the therapist's expertise and training, which may not be available in all healthcare facilities [23-29]. Finally, individual differences in stroke patients, such as B. Location and severity of brain injury affect the effectiveness of CPT techniques. While CPT techniques have been shown to be effective in stroke patients with milder impairments, patients with severe impairments may not tolerate or benefit from CPT techniques. Careful consideration of these limitations is necessary to optimize the use of CPT techniques in stroke patients and to maximize their effectiveness.

### Future perspectives

The future perspective of the role of Chest Physiotherapy (CPT) techniques in stroke patients suggests the need for further research and development. Areas for future research include studying the

long-term effects of CPT techniques on respiratory function and rehabilitation outcomes, developing novel CPT techniques and technologies to improve their effectiveness and efficiency, and determining the optimal timing, frequency, and duration of CPT -Interventions for stroke patients based on their individual characteristics and medical conditions. Advances in technology and personalized approaches to CPT interventions have the potential to improve the delivery of CPT techniques to stroke patients, improve their respiratory function, prevent respiratory complications, and facilitate their rehabilitation outcomes [21].

### Conclusion

In conclusion, Chest Physiotherapy (CPT) techniques are effective interventions for improving respiratory function, preventing respiratory complications, and facilitating mucus clearance in stroke patients. CPT techniques such as chest vibration, percussion, postural drainage, breathing exercises and coughing techniques have been found to have positive impacts on lung function, oxygen saturation and mucus clearance in stroke patients. The immediate effects of CPT techniques can improve the patient's ability to breathe, reduce respiratory distress, and prevent respiratory complications. Furthermore, the use of CPT techniques can improve the patient's overall quality of life, reduce the length of hospital stay, and decrease the cost of care. While there are limitations associated with the use of CPT techniques, careful consideration of these limitations can optimize the use of CPT techniques in stroke patients and maximize their effectiveness. CPT techniques should be considered an important component of the rehabilitation program for stroke patients to improve their respiratory function and prevent respiratory complications. Further research is needed to investigate the long-term effects of CPT techniques on stroke patients' respiratory function and rehabilitation outcomes.

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