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Review Article

Pulmonary rehabilitation care: Current perspective

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ABSTRACT

Pulmonary rehabilitation is a program that helps individuals with chronic respiratory diseases improve their physical function, quality of life, and overall well-being. The program typically involves a combination of exercise, education, and support to help patients manage their symptoms and improve their respiratory health.

Exercise is a crucial component of pulmonary rehabilitation and can help improve cardiovascular health, increase lung function, and reduce shortness of breath. Aerobic exercise, resistance exercise, and flexibility exercise are all important types of exercise used in pulmonary rehabilitation, with patients gradually increasing the intensity and duration of their workouts over time.

Breathing techniques are another essential component of pulmonary rehabilitation and can help patients manage their symptoms and improve their overall respiratory function. Techniques such as diaphragmatic breathing, pursed-lip breathing, and controlled coughing can help improve oxygenation, reduce shortness of breath, and improve overall respiratory function.

In addition to exercise and breathing techniques, pulmonary rehabilitation programs may also include education and support to help patients better manage their condition. This may include education on medication management, nutrition, stress management, and other topics relevant to respiratory health.

Overall, pulmonary rehabilitation is a comprehensive program that can help individuals with chronic respiratory diseases improve their physical function, reduce symptoms, and improve their overall quality of life. By incorporating exercise, breathing techniques, education, and support, pulmonary rehabilitation can help patients better manage their condition and achieve optimal respiratory health.

1. Pulmonary Rrehabilitation

Pulmonary rehabilitation is a comprehensive program designed to improve the lung function and overall health of people with chronic respiratory diseases. These diseases can cause significant limitations in daily activities, reduce exercise capacity, and lead to poor quality of life. The primary goals of pulmonary rehabilitation are to increase exercise tolerance, reduce symptoms such as shortness of breath, improve the ability to perform daily activities, reduce hospitalizations and emergency room visits, and also improve quality of life. [1–3]

Pulmonary rehabilitation is recommended for patients with chronic respiratory diseases who experience limitations in daily activities and have reduced exercise tolerance. The primary indications for pulmonary rehabilitation include COPD, interstitial lung disease, bronchiectasis, pulmonary hypertension, and cystic fibrosis. It may also be recommended for patients who have had lung surgery or a lung transplant, or who are preparing for surgery or a transplant. [4–6] It may also be recommended for patients who have experienced a recent exacerbation of their respiratory disease, or who have been hospitalized for

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a respiratory-related issue.

2. Components of pulmonary rehabilitation (Table 1)

Pulmonary rehabilitation is a comprehensive program that typically includes the following components: [7]

2.1. Exercise training

This component involves a structured program of physical activity tailored to meet the individual needs and abilities of each patient. Exercise training can include a variety of activities such as walking, cycling, strength training, and flexibility exercises. Exercise training helps to improve exercise tolerance, reduce shortness of breath, and improve muscle strength and endurance. The exercise targets different aspects of physical function and overall health. [8]

2.2. Aerobic exercise

Also known as cardio exercise, is any activity that increases heart rate and breathing rate for an extended period of time. Examples include walking, cycling, swimming, and jogging. Aerobic exercise is important for patients with chronic respiratory diseases as it helps to improve cardiovascular health, increase lung function, and reduce shortness of breath. During pulmonary rehabilitation, patients gradually increase the intensity and duration of their aerobic exercise, starting with low-intensity activities. [9]

2.3. Resistance exercise

Involves using weights, resistance bands, or body weight to build muscle strength and endurance. Examples include squats, lunges, and bicep curls. Resistance exercise is important for patients with chronic respiratory diseases as it helps to improve overall physical function, increase muscle strength, and reduce the risk of falls and other injuries. Patients typically start with low-intensity resistance exercises during pulmonary rehabilitation and gradually increase the intensity and number of repetitions over time. [10]

2.4. Flexibility exercise

Involves stretching and lengthening muscles to improve range of motion and reduce the risk of injury. Examples include yoga, Pilates, and static stretching. Flexibility exercise is important for patients with chronic respiratory diseases as it can help to improve posture, reduce muscle tension, and improve overall physical function. Patients engage in a variety of flexibility exercises designed to target specific muscle groups during pulmonary rehabilitation. [11]

Breathing exercises

Breathing exercises are designed to help patients learn to breathe more efficiently, reduce shortness of breath, and improve lung function. Two commonly used breathing techniques in pulmonary rehabilitation are pursed-lip

Table 1: Component of pulmonary rehabilitation

Component	Description	Examples
Exercise Training	Structured program of physical activity designed to improve overall fitness and endurance	Walking, cycling, strength training, flexibility exercises
Aerobic Exercise	Increases heart and breathing rate for an extended period of time	Walking, cycling, swimming, jogging
Resistance Exercise	Uses weights, resistance bands, or body weight to build muscle strength and endurance	Squats, lunges, bicep curls
Flexibility Exercise	Involves stretching and lengthening muscles to improve range of motion	Yoga, Pilates, static stretching
Breathing Exercises	Helps patients learn to breathe more efficiently, reduce shortness of breath, and improve lung function	Pursed-lip breathing, diaphragmatic breathing, paced breathing
Education and Self-Management Strategies	Provides education about the condition, how to manage symptoms, and how to live with a chronic respiratory disease	Disease management, coping strategies, nutrition
Nutritional Counselling	Provides guidance about maintaining a healthy diet, managing weight, and avoiding trigger foods	Maintaining a healthy diet, managing weight, avoiding trigger foods
Psychosocial Support	Provides counselling, support groups, and other resources to help patients manage the emotional impact of their condition	Counselling, support groups, other resources
Monitoring and Progression	Monitors patients using heart rate monitors or pulse oximeters to ensure appropriate exercise level and prevent overexertion; adjusts exercise program as patients progress	Heart rate monitor, perceived exertion rating, personalized exercise program

breathing and diaphragmatic breathing.

2.5. Pursed-lip breathing

Pursed-lip breathing is a breathing technique that involves exhaling through pursed lips. To perform pursed-lip breathing, patients take a deep breath in through their nose and then exhale slowly through pursed lips, as if blowing out a candle. This technique is used to help slow down the rate of breathing, reduce shortness of breath, and improve oxygen exchange in the lungs. Pursed-lip breathing can be particularly helpful for patients with chronic obstructive pulmonary disease (COPD) and other chronic respiratory diseases, as it can help to reduce feelings of breathlessness and improve exercise tolerance. It can also help patients to relax and reduce feelings of anxiety and stress.

2.6. Diaphragmatic breathing

Diaphragmatic breathing, also known as belly breathing, is a breathing technique that involves using the diaphragm to breathe instead of the chest muscles. To perform diaphragmatic breathing, patients lie down or sit comfortably with one hand on their chest and the other on their belly. They take a slow, deep breath in through their nose, allowing their belly to rise and expand, and then exhale slowly through their mouth, letting their belly fall. Diaphragmatic breathing is used to help patients with chronic respiratory diseases improve their breathing efficiency, reduce feelings of breathlessness, and improve lung function. By using the diaphragm to breathe instead of the chest muscles, patients can take deeper breaths and increase the amount of oxygen that enters their lungs. Diaphragmatic breathing can also help to reduce stress and anxiety and promote relaxation.[12]

2.7. Benefits of breathing techniques in pulmonary rehabilitation:[13,14]

Improved breathing control and efficiency
- Increased lung capacity and oxygen uptake
- Reduced shortness of breath
- Improved exercise tolerance and endurance
- Reduced anxiety and stress
- Improved relaxation and sleep
- Improved cough effectiveness
- Improved secretion clearance
- Reduced risk of respiratory infections

3. Education and Self-Management Strategies

When it comes to pulmonary rehabilitation, education and self-management play crucial roles in improving the health and well-being of individuals with chronic respiratory diseases such as chronic obstructive pulmonary disease (COPD) and asthma.

3.1. Education

Education can also provide individuals with the necessary knowledge and skills to manage their condition effectively. For instance, individuals with COPD can benefit from education on proper breathing techniques, medication management, and lifestyle changes such as quitting smoking and regular physical activity. Education can also provide individuals with the necessary knowledge and skills to manage their condition during exacerbations or flare-ups.

3.2. Self-management

Self-management skills can include medication adherence, symptom monitoring, and recognizing early warning signs of exacerbations. Pulmonary rehabilitation programs often incorporate self-management techniques such as pulmonary rehabilitation exercises, relaxation techniques, and goal-setting strategies. These techniques can help individuals manage their symptoms and improve their overall quality of life.[15–17]

3.3. Nutritional counselling

Proper nutrition is important for patients with chronic respiratory diseases to maintain good health and manage symptoms. Patients may receive guidance about maintaining a healthy diet, managing weight, and avoiding foods that may trigger symptoms. Here are some ways in which nutritional counselling can benefit individuals with these conditions:[18]

3.4. Managing weight

Weight management is essential for individuals with COPD and asthma as excess weight can worsen symptoms and reduce lung function. Nutritional counselling can help individuals achieve and maintain a healthy weight by providing them with information about healthy eating habits and portion control.

4. Meeting Nutritional Requirements

Individuals with COPD and asthma may have increased nutrient requirements due to increased energy expenditure, increased inflammation, and decreased nutrient absorption. Nutritional counselling can help individuals meet their nutritional requirements by providing them with information about nutrient-dense foods and supplements if necessary.

4.1. Managing comorbidities

Individuals with COPD and asthma are at increased risk of developing comorbidities such as diabetes, cardiovascular disease, and osteoporosis. Nutritional counselling can help manage these conditions by providing individuals with

Table 2: Tool used to measurefunctional capacity and outcomes

Measure	Definition	Measurement Tools
Exercise Capacity	Measure of an individual's ability to perform physical activity	Six-minute walk test (6MWT), Incremental shuttle walk test (ISWT)
Quality of Life	Measure of an individual's overall well-being, including physical, emotional, and social aspects	St. George's Respiratory Questionnaire (SGRQ), Chronic Respiratory Questionnaire
Dyspnoea	Measure of breathlessness, a common symptom in individuals with chronic respiratory diseases	Modified Borg scale, Medical Research Council (MRC) dyspnoea scale
Healthcare Utilization	Measure of the frequency and type of healthcare services utilized by individuals with chronic respiratory diseases	Hospitalization rates, emergency department visits, medication use

information about the impact of diet on these conditions and strategies for preventing and managing them.

5. Improving Lung Function

Nutritional counselling can also help improve lung function by providing individuals with information about the impact of diet on lung health. For example, diets high in fruits and vegetables have been shown to improve lung function in individuals with COPD.

6. Psychosocial Support

Patients with chronic respiratory diseases may experience anxiety, depression, and other emotional issues related to their condition. Psychosocial support can include counselling, support groups, and other resources to help patients manage the emotional impact of their condition.[19]

6.1. Monitoring and progression

Are are important aspects of exercise training in pulmonary rehabilitation. Patients may be monitored using a heart rate monitor or pulse oximeter to ensure they are exercising at an appropriate level and to prevent overexertion. Patients may also rate their perceived exertion level to help healthcare providers adjust the intensity of their exercise program. As patients progress through their pulmonary rehabilitation program, the intensity and duration of their exercise program may be adjusted to ensure continued progress. Patients may work with a physical therapist or other healthcare providers to develop a personalized exercise program that meets their individual needs and goals.[20]

7. Outcome Measures (Table 2)

Outcome measures are important tools used to evaluate the effectiveness of pulmonary rehabilitation programs. These measures are used to assess the impact of the program on the health and well-being of individuals with chronic respiratory diseases such as chronic obstructive pulmonary disease (COPD) and asthma. Here are some commonly used outcome measures in pulmonary rehabilitation.[21–23]

Overall, pulmonary rehabilitation plays a crucial role in improving the health and well-being of individuals with chronic respiratory diseases. By addressing the physical, emotional, and social needs of these individuals, pulmonary rehabilitation can help reduce symptoms, improve quality of life, and reduce healthcare utilization. As such, it is essential that individuals with chronic respiratory diseases are referred to and participate in pulmonary rehabilitation programs to receive the benefits of this important component of healthcare.

8. Conflicts of Interest

None.

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