

# Pulmonary Rehabilitation

## Definition, Concept, and History

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### KEYWORDS

- Pulmonary rehabilitation • Chronic obstructive pulmonary disease • Exercise training
- Behavioral change

### KEY POINTS

- Pulmonary rehabilitation is a comprehensive intervention including exercise training, education, and behavior change, which improves the physical and emotional condition of people with chronic respiratory disease.
- Pulmonary rehabilitation can and should be delivered at multiple times in the disease trajectory of chronic respiratory disease.
- Pulmonary rehabilitation, by its essential nature, is designed to provide the right therapy for the right patient at the right time and therefore, fits perfectly into the concept of integrated care.

### DEFINITION AND CONCEPT

Pulmonary rehabilitation is a complex intervention whose implementation varies widely among pulmonary rehabilitation centers worldwide, and indeed often varies considerably within a center, depending on the needs and goals of a particular respiratory patient. Furthermore, individual elements of the comprehensive pulmonary rehabilitation intervention, such as the promotion of exercise and self-management, are often applied in isolation as part of good medical care. Consequently, it is difficult to craft a succinct yet inclusive definition of pulmonary rehabilitation.

The 2013 American Thoracic Society/European Respiratory Society Statement on Pulmonary Rehabilitation perhaps comes closest to a workable definition of pulmonary rehabilitation: pulmonary rehabilitation is a comprehensive intervention based on a thorough patient assessment followed by patient-tailored therapies which include, but are not limited to, exercise training, education, and behavior change, designed to improve the physical and emotional condition of people with chronic respiratory disease and to promote the long-term adherence to health-enhancing behaviors.<sup>1</sup>

To better understand what pulmonary rehabilitation is, some amplification of this definition is necessary.

1. *Pulmonary rehabilitation.* Although combining different therapies, pulmonary rehabilitation is an entity on its own. Although each of its components could, and often should, be given as part of good medical care, these components are conveniently bundled into a package and delivered by professionals with expertise and experience in this area. Pulmonary rehabilitation is much more than the sum of its parts.<sup>2</sup>
2. *Comprehensive intervention.* Pulmonary rehabilitation can be delivered at multiple times in the disease trajectory of any individual patient with chronic respiratory disease. Its focus and components vary depending on the patient's goals, functional impairments, and disabilities. This approach requires a dedicated interdisciplinary team, which may include physicians, nurses, nurse practitioners, respiratory therapists, physiotherapists, occupational therapists, psychologists, behaviorists, exercise physiologists, nutritionists, and social workers. The composition of any particular pulmonary

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rehabilitation program will depend on available resources.

3. *Thorough patient assessment.* To effectively treat the often complex and unique morbidities of the individual patient with chronic respiratory disease, these must be first identified. For instance, exercise limitation in a patient with chronic obstructive pulmonary disease (COPD) often reflects multiple factors, such as ventilatory constraints, ambulatory muscle dysfunction, cardiovascular limitation, joint disease, and psychological and cognitive problems. Their identification will allow for a targeted and thereby more effective and efficient intervention.
4. *Patient-tailored therapies.* The intervention must be individualized to the unique therapeutic requirements of the patient, which result from the respiratory disease itself, comorbidities, treatments, and their psychological and social consequences. These therapies should be integrated to provide a seamless intervention throughout the course of a patient's disease.
5. *Exercise training, education, and behavior change.* The comprehensive pulmonary rehabilitation intervention includes multiple therapies. However, exercise training and education aimed at behavior change are its essential components. Although exercise training remains the cornerstone of pulmonary rehabilitation, in itself it is not sufficient to provide optimal and long-term benefits. It must be coupled with educational efforts aimed at promoting self-management skills and positive change in health behavior.
6. *Designed to improve the physical and emotional condition of people with chronic respiratory disease.* Pulmonary rehabilitation leads to substantial benefits in dyspnea, exercise capacity, health-related quality of life, and health care utilization. These benefits, which are often of greater magnitude than those from other medical therapies such as bronchodilators, are achieved without concurrent improvements in traditional measures of physiologic impairment, such as the forced expiratory volume in 1 second. This apparent paradox is explained by the fact that rehabilitation targets the often treatable systemic manifestations of chronic respiratory disease, such as peripheral muscle dysfunction, maladaptive health behaviors, and anxiety and depression. To fully delineate the beneficial effects of pulmonary rehabilitation, a comprehensive, patient-centered outcome assessment is necessary.
7. *Promote the long-term adherence to health-enhancing behaviors.* It would be naïve to think that an isolated, 6- to 12-week intervention such as exercise training would have a substantial long-term impact on a chronic

disease, a point that underscores the need to include interventions that promote true health-behavior change so as to maintain long-term benefits. This aspect has become an important focus in the implementation of pulmonary rehabilitation.

Optimal treatment of the often complex patient with chronic respiratory disease ideally requires seamless care across settings and providers, over the course of the disease: the concept of integrated care.<sup>3</sup> Pulmonary rehabilitation, by its essential nature, is designed to provide the right therapy for the right patient at the right time. These therapies may include providing smoking-cessation therapy when necessary, promoting regular exercise and physical activity in the home and community settings, fostering collaborative self-management strategies, optimizing pharmacotherapy and medication adherence, and, when needed, offering palliative care and hospice services. This approach requires partnering, communication, and coordination among health care providers, patients, and their families. Because pulmonary rehabilitation encompasses all of these strategies, it fits perfectly into this concept of integrated care.

## HISTORY

### *Early Years*

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Components of pulmonary rehabilitation have been provided as part of good medical care for centuries. However, in the 1960s and 1970s clinicians became aware that organizing these components into a comprehensive program could lead to substantial benefits for their patients.<sup>4</sup> Such components included breathing techniques, walking exercise, supplemental oxygen therapy, and bronchial hygiene techniques. These bundled interventions were first trialed, after which results were presented in the form of noncontrolled before-after studies or historically controlled studies.<sup>5–7</sup> In 1974, pulmonary rehabilitation was first given an official definition by the American College of Chest Physicians, and in 1981 the American Thoracic Society published its first official statement on pulmonary rehabilitation.<sup>4</sup>

Development in 2 general outcome areas fueled the growing popularity of pulmonary rehabilitation among clinicians: the development of the timed walk test in 1976, and the creation of the Chronic Respiratory Questionnaire, a patient-centered, health-related quality of life questionnaire for COPD, in 1987.<sup>8</sup> Pulmonary rehabilitation led to often striking improvements in these outcome areas.

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