Promoting Regular Physical Activity in Pulmonary Rehabilitation

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KEYWORDS

• Physical activity • Exercise • Behavior change • Chronic obstructive pulmonary disease
• Pulmonary rehabilitation

KEY POINTS

- Physical inactivity is common in individuals with chronic respiratory diseases, and worsens their prognosis.
- Physical activity is an important outcome of pulmonary rehabilitation because it is a potentially modifiable factor that can improve prognosis.
- Current evidence from pulmonary rehabilitation studies shows inconsistent results in modifying physical activity.
- Behavioral components of pulmonary rehabilitation are a target of future research aimed at having an impact on levels of physical activity.
- The cost and logistics of pulmonary rehabilitation make difficult the adoption of strategies that could potentially improve levels of physical activity.

INTRODUCTION

As a complex behavior, physical activity is influenced by a combination of individual, sociocultural, and environmental factors (**Fig. 1**). The prevailing focus on the pathophysiologic factors limiting physical activity has led to the general knowledge that individuals with chronic respiratory diseases are physically inactive in comparison with their healthy peers. This feature has been consistently observed in patients with chronic obstructive pulmonary disease (COPD),[1,2] but not in individuals with asthma or cystic fibrosis.[3,4] A discussion of the role of pulmonary rehabilitation on physical activity needs first to review those factors that drive inactivity, and the consequences of such inactivity.

The disability resulting from COPD reflects the paradigm of a vicious cycle of disturbing symptoms such as exertional dyspnea, followed by sedentarism and immobility, followed by increased dyspnea resulting from further deconditioning. Consequently, skeletal muscle dysfunction is frequent in these patients and, in addition to respiratory and cardiac problems, further decreases exercise tolerance.[5] Physical inactivity in turn causes muscle wasting.[6] Symptoms such as dyspnea and fatigue, perceived to a greater extent by patients with COPD than by those with other diseases,[7] further limit exercise tolerance, favoring the negative trend (vicious cycle) that leads to generalized weakness, sedentary lifestyle, and, ultimately, immobility.[8] Similar mechanisms limit activity in other chronic diseases such as interstitial lung disease and bronchiectasis.[9,10]

Psychological factors likely play an important role in disability in all chronic respiratory diseases,

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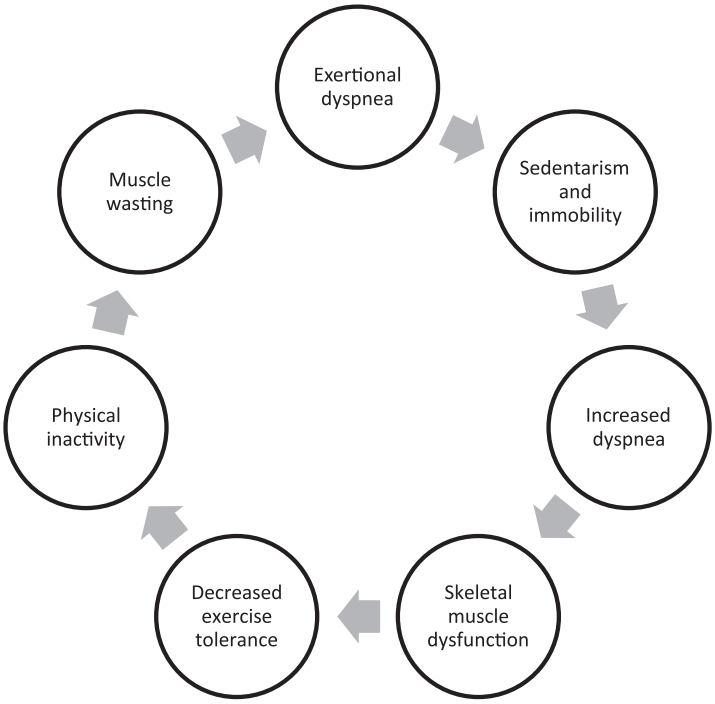

Fig. 1. Cycle of symptoms resulting from disability caused by chronic obstructive pulmonary disease.

but research on this topic is relatively scarce in respiratory disease. An example of psychological factors influencing physical activity is the finding that some asthma patients avoid participating in vigorous physical activity owing to the fear of exercise-induced bronchoconstriction.[11] It should be noted that, to date, the effects of anxiety and depression on physical-activity levels of COPD patients remain contradictory.[12,13]

The habitually low level of regular physical activity in many patients with chronic respiratory disease is of critical importance in their long-term prognosis. Again, research is more abundant for COPD than for other diseases: low levels of physical activity have been consistently demonstrated to predict higher mortality[14–17] and to increase the risk of readmission after a hospitalization for a COPD exacerbation,[14,17–20] irrespective of the setting, geographic location, cultural environment, or methods for measuring physical activity. In patients with asthma, higher levels of physical activity have been associated with reduced risk of exacerbation[21] and reduced respiratory symptoms.[22,23]

COMPONENTS OF PULMONARY REHABILITATION ADDRESSING PHYSICAL ACTIVITY

Pulmonary rehabilitation programs provide an excellent framework to enhance patients' capabilities and promote physical activity. Rehabilitation aims to address both the pathophysiologic limitations to physical activity and the low levels of self-efficacy for regular exercise (through promoting self-management), thus addressing the 2 pillars of inactivity: physical limitation and maladaptive behavior.

Exercise Training

Exercise training is often regarded as the cornerstone of pulmonary rehabilitation. At present there is a solid body of literature clearly indicating that exercise training, by itself or as part of a pulmonary rehabilitation program, leads to improvements in a variety of negative aspects linked to chronic respiratory disease such as dyspnea, fatigue, exercise intolerance, muscle weakness, and poor health-related quality of life.[24,25] Furthermore, it is also clear that the magnitude of training effects depends on factors involved in the exercise training program, such as intensity, frequency, duration, and mode, which are described in detail in articles elsewhere in this issue. However, it must be emphasized that exercise and physical activity are not identical concepts. Physical activity comprises any bodily movement produced by skeletal muscles that results in energy expenditure, whereas exercise is a subset of physical activity that is planned, structured, repetitive, and