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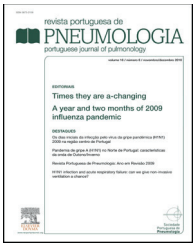

REVIEW

Prescribing exercise training in pulmonary rehabilitation: A clinical experience

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Abstract Built around exercise training, pulmonary rehabilitation (PR) is a multidisciplinary, evidence-based, comprehensive approach to working with the patient as a whole and not just the pulmonary component of the disease. Integrated into the individualized treatment, this intervention aims to reduce symptoms, optimize functional status, increase participation in daily life, and reduce health care costs through stabilizing or reversing systemic manifestations of the disease. Although there are many other components that should be considered to manage the impairment and symptom burden, supervised exercise training is considered the cornerstone of effective pulmonary rehabilitation. This paper addresses our clinical experience at *Institut universitaire de cardiologie et de pneumologie de Québec* to assess and manage exercise training in line with the current recommendations and guidelines surrounding PR.

PALAVRAS CHAVE
Reabilitação pulmonar;
Exercício físico;
Experiência clínica

Prescrição de exercício físico na reabilitação pulmonar: uma experiência clínica

Resumo Construída com base no exercício físico, a reabilitação pulmonar (RP) é uma abordagem multidisciplinar, fundamentada e abrangente para trabalhar com o doente como um todo, e não apenas com a componente pulmonar da doença. Integrado no tratamento individual, esta intervenção visa reduzir os sintomas, optimizar o estado funcional, aumentar a participação na vida diária e reduzir os custos do tratamento de saúde, através da estabilização ou inversão das manifestações sistémicas da doença. Embora existam muitos outros componentes que devem ser tidos em consideração para gerir o peso da incapacidade e dos sintomas, o exercício físico supervisionado é considerado o fundamento da reabilitação pulmonar eficiente. Este documento trata da nossa experiência clínica no *Institut universitaire de cardiologie et de pneumologie de Québec* para avaliar e gerir o exercício físico em linha com as recomendações e orientações actuais envolvendo a RP.

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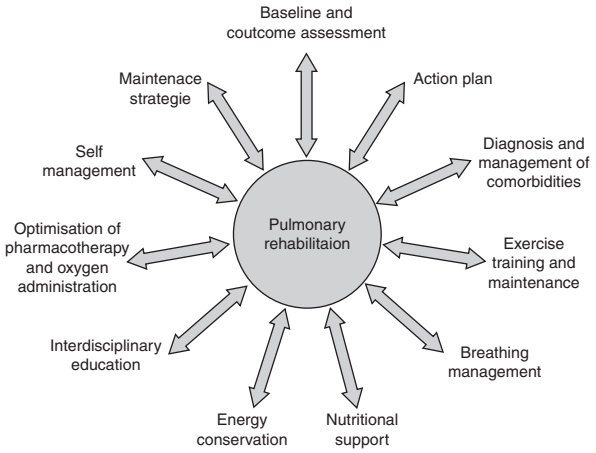

Figure 1 Key components of pulmonary rehabilitation.

Introduction

Chronic obstructive pulmonary disease (COPD) is a major cause of morbidity and mortality wordwide and it is expected that by 2020 COPD will be the fifth most burdensome disease and the third leading cause of mortality.[1] The natural course of the disease is punctuated by episodes of acute exacerbation which contribute to the increased morbidity and mortality and socioeconomic burden associated with COPD.[2] Patients with COPD frequently show exercise intolerance and dyspnea, reduced ability to participate in activities of daily living, reduced health-related quality of life and increased use of health care resources.[3] If optimal bronchodilation can be seen as a first step in the treatment of patients with COPD, more effective treatments (e.g., improvements in exercise performance, symptoms, and health-related quality of life) are often achieved after pulmonary rehabilitation (PR).[4] Comprehensive PR aims at tackling the systemic consequences of COPD and also the behavioral and educational shortcomings observed in many patients and it is now widely recognized as an effective and key intervention in the management of COPD.[1,5–10] It is also suggested that PR appears to be cost-effective, it decreases utilization of health care services.[11,12]

Pulmonary rehabilitation definition, concept and setting

Built around exercise training, PR is a multidisciplinary, evidence-based comprehensive approach to addressing the patient as a whole and not only the pulmonary component of the disease (Fig. 1). Integrated into the individualized treatment of the patient, PR is individually tailored and designed to reduce symptoms, optimize functional status, increase participation, and reduce health care costs through stabilizing or reversing systemic manifestations of the disease.[5,8,10,13–17]

In a broader sense, PR includes a spectrum of strategies integrated into the lifelong management of patients with chronic respiratory disease and involves a dynamic and active collaboration between patients, families, and health care providers. Pulmonary rehabilitation typically includes individualized patient assessment, supervised exercise training, self-management education, psychosocial support and nutritional counseling.[5,10] Patients are usually enrolled in a 6–12-week exercise program which they attend 2–3 times per week.

Individualized patient assessment should include medical history, physical exam and accurate diagnosis of their respiratory condition based on pulmonary function testing and detection of comorbidities that may interfere with the rehabilitation process.[10] Baseline assessment should also comprise measures of exercise capacity, symptoms and quality of life.[18] Hypoxemia at rest and during effort is what should be looked for.

Exercise training is the cornerstone of effective PR and preferably includes both aerobic and muscle training. To achieve clinically relevant results, training should be closely supervised and performed for 30–45 min, at least 3 days per week. Patients should undertake a minimum of 20 sessions, but longer programs produce broader and more long-lasting results.[5,16,19–22]

Nutritional intervention should be considered for patients with body composition abnormalities such as cachexia and obesity which is becoming one of the most prevalent nutritional issues in COPD.[23] Patients with fears and anxiety may benefit from psychosocial support and the integration of occupational therapy in PR can improve autonomy in activities of daily living. Moreover, in order to facilitate chronic disease self-management there are other areas of importance: these include approaches designed to (1) facilitate smoking cessation; (2) optimize pharmacotherapy; (3) assist with early identification and treatment of acute exacerbations; (4) manage acute dyspnea; (5) increase physical activity; (6) improve body composition; (7) promote mental health; (8) facilitate advance care planning; and (9) establish social support networks.[24] Finally, strategies to promote a more active lifestyle following PR, such as the implementation of a home exercise program should be considered.

Pulmonary rehabilitation can be effective as inpatient, hospital- or community-based outpatient, or home-based programs.[5,15,25] Inpatient programs are generally more expensive and suitable for patients with limited transportation or severe deconditioning requiring specific resources such as nutritional supplementation or training for home ventilation.[8] Because outpatient programs offer rehabilitation with secure and predictable improvements at a relatively low cost, multidisciplinary PR programs are typically implemented in outpatient hospital- or community-based settings. Home-based exercise programs are also effective in improving exercise tolerance and quality of life.[26,27] Home-based rehabilitation is well suited for highly motivated, self-directed individuals but appears to be less successful with severe, homebound patients.[28,29] Home-based rehabilitation is particularly effective in maintaining improvements obtained in an outpatient setting[30]

Assessment in pulmonary rehabilitation

In order to guide assessment and prescription of exercise training in PR programs, cardiorespiratory exercise capacity and limb muscle function are the essential components to be evaluated. As there are several tests available; a summary of the most common validated tests, as well as their essential