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PULMONARY REHABILITATION: JOINT ACCP/AACVPR EVIDENCE-BASED CLINICAL PRACTICE GUIDELINES

Pulmonary Rehabilitation Executive Summary*

Joint American College of Chest Physicians/ American Association of Cardiovascular and Pulmonary Rehabilitation Evidence-Based Clinical Practice Guidelines

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Pulmonary diseases are becoming more important causes of morbidity and mortality in the modern world, with COPD being the most common and a major cause of lung-related death and disability.[1] Pulmonary rehabilitation has emerged as a recommended standard of care for patients with chronic lung disease based on a growing body of scientific evidence. In 1997, the American College of Chest Physicians and the American Association of Cardiovascular and Pulmonary Rehabilitation published evidence-based guidelines.[2,3] Because of the increase in the published literature on pulmonary rehabilitation, the purpose of this document is to update the 1997 guidelines with a systematic, evidence-based review of the literature.

In the United States, COPD accounted for 119,000 deaths in 2000, ranking it the fourth-leading cause of death and the only major disease among the top 10 that continues to increase.[4–7] Mortality data tend to underestimate the impact of COPD because it is more likely to be listed as contributory rather than the underlying cause of death, and is often not listed at all.[8,9] Between 1980 and 2000, death rates for COPD increased 282% for women compared to 13% for men. Also in 2000, the number of women dying from COPD exceeded the number of men.[4]

COPD develops insidiously over decades and, because of the large reserve in lung function, there is a long preclinical period. Affected individuals have few symptoms, and the disease remains undiagnosed until it is at a relatively advanced stage. In a population survey, Burrows[10] reported that only 34% of persons with COPD had ever consulted a physician, 36% denied having any respiratory symptoms, and 30% denied dyspnea on

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exertion, which is the primary symptom of COPD. National Health and Nutrition Examination Survey III data estimate that 24 million US adults have impaired lung function,[4] while only 10 million report a physician diagnosis of COPD. Worldwide, the burden of COPD is projected to increase substantially, paralleling the rise in tobacco use, particularly in developing countries. An analysis by the World Bank and World Health Organization ranked COPD 12th in 1990 in disease burden reflected in disability-adjusted years of life lost.[8]

For consistency throughout the guideline, the Panel used the description of severity of COPD as recommended by the Global Initiative for Chronic Obstructive Lung Desease[11] and American Thoracic Society/European Respiratory Society[12] guidelines based on FEV_1, as follows: stage I, mild, $FEV_1 \geq 80\%$ of predicted; stage II, moderate, FEV_1 50 to 80% of predicted; stage III, severe, FEV_1 30 to 50% of predicted; and stage IV, very severe, FEV_1 30% of predicted.

The American Thoracic Society and the European Respiratory Society recently adopted the following definition of pulmonary rehabilitation[13]:

> Pulmonary rehabilitation is an evidence-based, multidisciplinary, and comprehensive intervention for patients with chronic respiratory diseases who are symptomatic and often have decreased daily life activities. Integrated into the individualized treatment of the patient, pulmonary rehabilitation is designed to reduce symptoms, optimize functional status, increase participation, and reduce health care costs through stabilizing or reversing systemic manifestations of the disease.

This definition focuses on three important features of successful rehabilitation: (1) a multidisciplinary approach, (2) an individualized program tailored to the patient needs, and (3) attention to physical and social function.

Rehabilitation programs for patients with chronic lung disease are well established as a means of enhancing standard therapy in order to control and alleviate symptoms and optimize functional capacity.[2,13–15] The primary goal is to restore the patient to the highest possible level of independent function, which is accomplished by helping patients learn more about their disease, treatments, and coping strategies.

Pulmonary rehabilitation is appropriate for any patient with stable chronic lung disease who is disabled by respiratory symptoms. Programs typically include components such as patient assessment, exercise training, education, nutritional intervention, and psychosocial support. These programs have been successfully applied to patients with diseases other than COPD such as interstitial diseases, cystic fibrosis, bronchiectasis, and thoracic cage abnormalities.[16]

Through a thorough and systematic review of the literature, the Panel developed the following recommendations on rehabilitation for patients with chronic lung disease:

1. Recommendation: A program of exercise training of the muscles of ambulation is recommended as a mandatory component of pulmonary rehabilitation for patients with COPD. *Grade of Recommendation: 1A*

2. Recommendation: Pulmonary rehabilitation improves the symptom of dyspnea in patients with COPD. *Grade of Recommendation: 1A*

3. Pulmonary rehabilitation improves health-related quality of life in patients with COPD. *Grade of Recommendation: 1A*

4. Recommendation: Pulmonary rehabilitation reduces the number of hospital days and other measures of health-care utilization in patients with COPD. *Grade of Recommendation: 2B*

5. Recommendation: Pulmonary rehabilitation is cost-effective in patients with COPD. *Grade of Recommendation: 2C*

6. Statement: There is insufficient evidence to determine if pulmonary rehabilitation improves survival in patients with COPD. No recommendation is provided.

7. Recommendation: There are psychosocial benefits from comprehensive pulmonary rehabilitation programs in patients with COPD. *Grade of Recommendation: 2B*

8. Recommendation: Six to 12 weeks of pulmonary rehabilitation produces benefits in several outcomes that decline gradually over 12 to 18 months. *(Grade of Recommendation: 1A)* **Some benefits, such as health-related quality of life, remain above control at 12 to 18 months.** *(Grade of Recommendation: 1C)*

9. Recommendation: Longer pulmonary rehabilitation programs (12 weeks) produce greater sustained benefits than shorter programs. *Grade of Recommendation: 2C*

10. Recommendation: Maintenance strategies following pulmonary rehabilitation have a modest effect on long-term outcomes. *Grade of Recommendation: 2C*

11. Recommendation: Lower-extremity exercise training at higher exercise intensity produces greater physiologic benefits than lower-intensity training in patients with COPD. *Grade of Recommendation: 1B*

12. Recommendation: Both low- and high-intensity exercise training produce clinical benefits for patients with COPD. *Grade of Recommendation: 1A*

13. Recommendation: Addition of a strength training component to a program of pulmonary

rehabilitation increases muscle strength and muscle mass. *Strength of evidence: 1A*

14. Recommendation: Current scientific evidence does not support the routine use of anabolic agents in pulmonary rehabilitation for patients with COPD. *Grade of Recommendation: 2C*

15. Recommendation: Unsupported endurance training of the upper extremities is beneficial in patients with COPD and should be included in pulmonary rehabilitation programs. *Grade of Recommendation: 1A*

16. Recommendation: The scientific evidence does not support the routine use of inspiratory muscle training as an essential component of pulmonary rehabilitation. *Grade of Recommendation: 1B*

17. Recommendation: Education should be an integral component of pulmonary rehabilitation. Education should include information on collaborative self-management and prevention and treatment of exacerbations. *Grade of Recommendation: 1B*

18. Recommendation: There is minimal evidence to support the benefits of psychosocial interventions as a single therapeutic modality. *Grade of Recommendation: 2C*

19. Statement: Although no recommendation is provided since scientific evidence is lacking, current practice and expert opinion support the inclusion of psychosocial interventions as a component of comprehensive pulmonary rehabilitation programs for patients with COPD.

20. Recommendation: Supplemental oxygen should be used during rehabilitative exercise training in patients with severe exercise-induced hypoxemia. *Grade of Recommendation: 1C*

21. Recommendation: Administering supplemental oxygen during high-intensity exercise programs in patients without exercise-induced hypoxemia may improve gains in exercise endurance. *Grade of Recommendation: 2C*

22. Recommendation: As an adjunct to exercise training in selected patients with severe COPD, noninvasive ventilation produces modest additional improvements in exercise performance. *Grade of Recommendation: 2B*

23. Statement: There is insufficient evidence to support the routine use of nutritional supplementation in pulmonary rehabilitation of patients with COPD. No recommendation is provided.

24. Recommendations: Pulmonary rehabilitation is beneficial for some patients with chronic respiratory diseases other than COPD. *Grade of Recommendation: 1B*

25. Statement: Although no recommendation is provided since scientific evidence is lacking, current practice and expert opinion suggest that pulmonary rehabilitation for patients with chronic respiratory diseases other than COPD should be modified to include treatment strategies specific to individual diseases and patients in addition to treatment strategies common to both COPD and non-COPD patients.

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