

Pulmonary Rehabilitation What is ATS Telling Us about Exercise Prescription in COPD

Chris Garvey FNP, MSN, MPA, Pulmonary Rehabilitation and Sleep Disorders, UCSF

- COPD is associated with disabling dyspnea, skeletal muscle dysfunction, and significant morbidity and mortality.
- Current guidelines recommend pulmonary rehabilitation (PR) to improve dyspnea, functional capacity and quality of life.¹⁻⁹
- Translating exercise science into safe and effective exercise training requires interpretation and use of current guidelines and recommendations.
- The ATS / ERS Pulmonary Rehabilitation Statement¹ identifies that exercise prescription for persons with chronic respiratory disease are the same as those for healthy elderly individuals. Training loads must exceed loads encountered during daily life and should progress during the initial PR training.
- **Endurance training** targets the muscles of walking to improve cardiorespiratory fitness. For high intensity exercise, levels of more than 60% of peak work capacity for 20 to 60 minute are suggested. Intensity targets a dyspnea scores 4 to 6 / 10 (moderate to very severe) or RPE (rating of perceived exertion) scale of 12 to 14/20 (somewhat hard). An exercise frequency of 3 to 5 sessions per week is recommended. Walking is considered to be the best training modality if the goal is to increase walking endurance.
- **Resistance training** works to optimize muscle strength and endurance. Options include repetitive lifting of weights (load options include 60 to 70% of one repetition maximum) 2-3 times per week. Once initial load and frequency is established, progression options could include increasing the weight, number of repetitions per set, number of sets of each exercise, and/or decreasing the rest period between sets or exercises.

Upper limb training increases upper limb function in COPD. The optimal modality for upper limb training is not known. Examples of aerobic upper limb training include arm cycle ergometer and resistance training (free weights and elastic bands). Muscles that may be targeted are biceps, triceps, deltoids, latissimus dorsi and pectorals. No specific details of starting loads or progression are given.

Flexibility training: While there are no trials to demonstrate the efficacy of flexibility training in chronic respiratory disease, it is commonly used in PR.

Pulmonary Rehabilitation program duration: A minimum of eight weeks of training is required for clinically important changes in exercise capacity and quality of life. Improvements in functional exercise capacity seem to plateau after 12 weeks of exercise training. Longer programs may enhance longevity of training-related improvements and optimize the likelihood of behavioral changes on program completion, such as increased daily physical activity.

Other recommendations: Individuals who are receiving long term oxygen therapy should continue this during training and may require a higher flow rate than their usual prescription. Individual oxygen titration trials are proposed to identify individuals with COPD who might benefit from oxygen during training.

Summary

Comprehensive PR results in improvement in exercise capacity, dyspnea and quality of life. Exercise recommendations are available from nearly all major U.S. and international pulmonary organizations.¹⁻⁹ All major guidelines recommend aerobic and resistance training with exercise prescriptions that include domains of exercise frequency, duration and intensity. None of the guidelines make clear and specific recommendations for progression of endurance training over the course of the program. Recommendations for progression of resistance exercise are not consistent.

In the absence of one optimal exercise prescription strategy for COPD, health care professionals should be familiar with all major, evidence based PR guidelines. The core components of exercise training programs for COPD are endurance and resistance training; and should be included in all exercise prescriptions. Clinicians should use clinical judgment and a collaborative, multidisciplinary team approach to individualized exercise training, prescription and progression. A baseline and ongoing assessment that includes disease and symptom severity, comorbidities and patient goals should be emphasized. Individual and group measurement and analysis of patient centered outcomes and exercise capacity. PR should emphasize sustainable exercise that translates into long term increased physical activity. Future

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