Personalized exercise training in chronic lung diseases

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Setting the scene:
The aim of this review is to establish the principles and modalities of personalized exercise training and the effects of exercise training across a number of CRD. In addition, this review provides information on personalized exercise prescription for CRD patients with co-morbidities.

What did they do?
Chronic respiratory diseases (CRD) are characterized by exertional dyspnoea, exercise limitation and reduced health-related quality of life (QoL). Exercise training is essential for improving symptoms, physical function and QoL. Current research available supports the effectiveness of exercise training in patients with chronic obstructive pulmonary disease (COPD), cystic fibrosis and interstitial lung disease (ILD).

TYPES OF PERSONALIZED EXERCISE TRAINING USED IN CHRONIC LUNG DISEASES:

1- Endurance training modalities: Optimal exercise modalities for endurance training include cycling on a cycle ergometer and/or walking on a treadmill or on a flat surface. The prescription of such modalities should be individualized for each patient’s chronic lung condition. Stationary cycling is commonly implemented as it provides precise implementation of training intensity and a greater load on the locomotor muscles and results in less oxygen desaturation than walking. However, for certain individuals, walking training (treadmill or flat ground) may have more beneficial effects as it is an activity easily translated into improvements in walking capacity. Alternative forms of exercise are stair climbing, stepping, Nordic walking and water-based exercise training.

2- One-legged cycling: One-legged cycling constitutes an alternative modality providing an aerobic stimulus to the leg muscles without placing a high ventilatory load on the respiratory system.
3- Resistance/strength training: Resistance training involves the training of local muscle groups by the repetitive lifting or pushing of moderately heavy weights.

4- Upper limb training: aerobic regimens (arm cycle ergometer) and resistance (free weights and elastic bands) regimens.

5- Flexibility and stretching exercises: includes stretching of major muscle groups such as the calves, hamstrings, quadriceps and biceps, as well as motion exercises for the neck, shoulders and trunk.

6- Water-based rehabilitation.

7- Tai Chi: Studies have found that Tai Chi achieved improved pulmonary function and exercise capacity in patients with COPD compared to usual care.

8- Yoga.

9- Whole-body vibration training Whole-body vibration training involves an individual standing on a vibrating platform that produces sinusoidal oscillations. These vibrations at a high intensity induce muscle contractions from the leg through to the trunk. Individuals have no direct influence on muscle activity, removing the voluntary muscle contractions which make up common resistance activities.

**Takeaway message:**
This literature demonstrates that in the majority of CRD, whole-body exercises, consisting of aerobic and resistance training, decrease respiratory symptoms, improve cardiovascular and muscle function leading to significant improvements in functional capacity.