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# *Exercise rehabilitation for interstitial lung disease*

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Emerging evidence suggests that adverse alterations of skeletal muscle morphology and function occur in interstitial lung diseases. These alterations appear to be associated with functional limitations, dyspnea and fatigue. Ultimately, muscle dysfunction offers a promising indication for therapeutic intervention, as it seems partially reversible by exercise training.

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**BY: PROF. ANNE HOLLAND**

**I**nterstitial lung diseases (ILDs) have a large symptom burden. They are characterised by dyspnoea on exertion, reduced health-related quality of life (QoL) and exercise intolerance. Fatigue may also be prominent, particularly in those with sarcoidosis, and mood disturbance is common. Many patients display exercise-induced hypoxemia that may be profound, especially those with idiopathic pulmonary fibrosis (IPF) or severe lung disease. The non-cardiorespiratory manifestations of ILD also contribute to exercise intolerance, especially peripheral muscle dysfunction. Quadriceps force is reduced, with average values that are 20 to 35% lower than healthy controls. Deconditioning of skeletal muscle plays a key role, although systemic effects of ILD on muscle have not been ruled out in some ILDs (e.g. IPF), and are rare but well documented in others (e. g. muscle sarcoidosis). Treatments such as corticosteroids may also adversely impact on muscle function.

## **Exercise-based rehabilitation**

There is mounting evidence that exercise-based

rehabilitation programs can improve symptoms, increase exercise capacity and enhance health-related QoL in people with a range of ILDs. A Cochrane review analysed the effects of exercise-based rehabilitation in nine studies with 386 participants, the majority of whom had IPF (40%) and sarcoidosis (24%).<sup>1</sup> Improvements in exercise capacity and health-related QoL following rehabilitation were statistically and clinically significant. People with IPF achieved similar benefits to those with other types of ILD, despite the progressive nature of their disease. Rehabilitation may also improve fatigue, anxiety and depression. The longer term effects of exercise rehabilitation in ILD are less well documented. Gains in exercise capacity may not be maintained at 6-12 months after completion of rehabilitation, although improvements in health-related QoL are better sustained. The mechanism by which exercise rehabilitation improves outcomes in ILD is not clearly understood. It is most likely that rehabilitation ameliorates peripheral muscle dysfunction by providing an effective training stimulus to muscle. It may also improve cardiovascular fitness, improve disease self-management and provide effective psychosocial support. There is no evidence that



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rehabilitation impacts the progression of lung disease or survival. Because rehabilitation delivers meaningful gains in patient centred outcomes, it is a recommended treatment for people with ILD in American Thoracic Society (ATS) / European Respiratory Society (ERS) guideline for IPF management and the ATS/ERS pulmonary rehabilitation statement.<sup>2,3</sup>

### **Optimal training program in ILD**

Whole body exercise training is central to rehabilitation for ILD. Most programs use a combination of endurance and resistance training exercise, with at least two supervised training sessions each week for 8-12 weeks and 30 minutes of endurance training in each session. This is similar to the exercise prescription recommended for people with chronic obstructive pulmonary disease (COPD) undergoing pulmonary rehabilitation. However

due to the unique pathophysiology of ILD, modifications to the exercise prescription may be required. In some individuals with ILD, severe dyspnoea limits the training loads that can be tolerated. Patients may also exhibit more severe exercise induced desaturation during training than those with other chronic lung diseases. Alternative training strategies, such as interval training or partitioning of exercising muscle (e.g. one legged cycling) may be useful to reduce desaturation and maintain symptoms within acceptable limits. Rehabilitation for ILD should occur in a setting where supplemental oxygen can be administered during training as required. Recent data suggest that in sarcoidosis, inspiratory muscle training improves exercise capacity and dyspnoea but not QoL; this may be a useful training strategy for patients who are unable to participate in whole body exercise training due to comorbidities such as arthritis. A thorough patient assessment at entry to rehabilitation will assist to tailor the exercise prescription to the individual's needs.

Pulmonary rehabilitation programs offer the opportunity to address other critical aspects of ILD care, including management of comorbidities, symptoms, nutritional status and mood. Qualitative research has shown that whilst people with ILD are happy to attend rehabilitation classes with patients who have other chronic lung diseases (e.g. COPD), they would like ILD-specific educational content to be provided, including controlling cough, managing medications and their side effects, and disease management strategies.<sup>4</sup> This reinforces the need for clinicians to tailor all components of the rehabilitation program to the specific needs of people with ILD.



*Figure 1. Whole body endurance training is a key component of rehabilitation for people with an interstitial lung disease.*

## Practice recommendations

An exercise-based rehabilitation program should be offered to all people with ILD with dyspnoea, fatigue or exercise intolerance. Expected outcomes are improvements in strength and endurance, reductions in dyspnoea and fatigue, and improvement in health-related QoL. People with ILD can be included in existing pulmonary rehabilitation programs alongside people with other chronic lung diseases. However the program should be tailored to the specific needs of the individual with ILD, including use of training modalities that keep dyspnoea to an acceptable level, application of oxygen therapy during exercise and delivery of disease-relevant education. A thorough patient assessment should be performed at the beginning and end of rehabilitation to evaluate program outcomes, including assessment of dyspnoea, health-related QoL and exercise capacity. Consideration should be given to assessment of fatigue, especially in people with sarcoidosis, as well as mood status (anxiety and depression). People with ILD may benefit from rehabilitation at any stage in the disease course, however early referral is recommended, so that patients can establish positive exercise behaviours as soon as possible.

## References

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