Pulmonary rehabilitation for people with COPD

KEY PRACTICE POINTS:

- Pulmonary rehabilitation is an umbrella term for a structured programme which offers supervised exercise and education to patients with COPD, usually over a period of eight weeks
- Pulmonary rehabilitation is known to relieve dyspnoea and fatigue, improve mental health and quality of life, and increase the sense of control that patients with COPD have over their health, while reducing their risk of hospitalisation
- All symptomatic patients with COPD will benefit from pulmonary rehabilitation, particularly:
  - At diagnosis
  - After discharge from hospital following an exacerbation
  - When symptoms are progressively deteriorating
- Health professionals may need to use creative strategies to adapt the basic components of pulmonary rehabilitation for patients unable to attend formal programmes

Pulmonary rehabilitation is a behavioural intervention for patients with chronic obstructive pulmonary disease (COPD) that improves symptom control and quality of life, reduces hospital admissions and teaches self-management skills. There are a variety of pulmonary rehabilitation programmes available, all of which offer supervised exercise and education to motivate patients and promote sustainable behaviour change. Health professionals in primary care can raise awareness of pulmonary rehabilitation, refer patients to programmes, recommend personalised exercise for those unable to attend formal programmes and provide ongoing support to patients who have completed programmes to help them maintain the benefits they have gained.

Pulmonary rehabilitation is an essential part of COPD management

People with chronic obstructive pulmonary disease (COPD) undergo a variable but progressive functional decline that causes muscle de-conditioning, reduces their quality of life and increases their risk of hospitalisation and death.[1, 2] Pulmonary rehabilitation refers to the use of non-pharmacological

interventions to improve the physical and psychological health of these patients by encouraging sustainable self-management skills. The interventions are part of a structured programme which is typically delivered by a physiotherapist in an outpatient setting over eight weeks. Physical exercise is always included in pulmonary rehabilitation programmes to improve strength and endurance of limbs and respiratory muscles. Education, smoking cessation, breathing exercises, nutritional advice, energy conservation strategies and psychological support can also be included. Following completion of a programme, patients should be encouraged to continue to exercise regularly in order to maintain the health benefits they have gained.

Rehabilitation programmes reduce symptoms and improve quality of life

A systematic review of 65 randomised controlled trials found overwhelming evidence that pulmonary rehabilitation programmes benefit patients.[2] Patients who complete these programmes are likely to have:[2–4]

- An increased sense of control and reduced breathlessness (self-reported)
- Improved fitness and energy levels
- Increased quality of life
- A reduced risk of hospitalisation due to exacerbations and a reduced risk of admission to hospital following an exacerbation

Compared to the use of inhaled medicines alone, pulmonary rehabilitation results in greater improvements in quality of life and functional exercise capacity for patients with COPD.[2]

Many patients with COPD have co-morbidities, e.g. cardiovascular disease, depression, diabetes,[1] which are also likely to improve following participation in pulmonary rehabilitation programmes.

Exercise is known to decrease dyspnoea by increasing respiratory volume and reducing dynamic hyperinflation.[2] Muscle function and exercise tolerance are also increased with regular physical activity, while fatigue is delayed.[2] The education component of a pulmonary rehabilitation programme aims to improve decision-making and help patients better manage their condition.[2]

When to consider pulmonary rehabilitation

The key times for referral when symptomatic patients are likely to gain the most benefit from pulmonary rehabilitation are:[1]

1. At diagnosis
2. Immediately following discharge from hospital for an exacerbation; typically, pulmonary rehabilitation has been offered to patients when they are stable, however, the Australian and New Zealand Pulmonary Rehabilitation Guidelines now recommend that patients who are hospitalised due to a COPD exacerbation should attend supervised pulmonary rehabilitation within two weeks of being discharged (often patients will be initiated on a programme while in hospital).[3]
3. If the patient's symptoms are progressively deteriorating

Find a local rehabilitation programme

Details of regional pulmonary rehabilitation programmes can be provided by DHBs or local branches of the Asthma and Respiratory Foundation, see: **www.asthmafoundation.org.nz/about-us/regional-support**

More referrals, more programmes and improved attendance is needed

Despite being a key component of COPD management, referrals to formal rehabilitation programmes are low, and approximately half of patients in New Zealand who are referred do not complete programmes.[5]

A lack of programmes, variation in the type of programmes offered, transportation issues and low referral rates are widely acknowledged barriers to participation in pulmonary rehabilitation.[3] Some patients may also feel reluctant to attend programmes because they have limited respiratory function, have never exercised, have had negative experiences with previous programmes, e.g. felt uncomfortable in the group, or they are worried that they will be blamed for their condition because they are still smoking.

Overcoming barriers to participation

There are no proven strategies for improving participation in pulmonary rehabilitation programmes and health professionals in primary care will need to tailor their approach to the individual patient and the community they practice in. A reasonable starting point is to discuss any concerns or barriers that may prevent attendance so that solutions can be explored.

Patients with moderate to severe symptoms may need extra encouragement to participate. These patients can be reassured that the intensity level will be tailored to their fitness, and persistence with the programme will allow them to slowly extend the boundaries of what they are able to achieve.

Patients who strongly prefer not to exercise may be encouraged to start with other activities. For example, Sing Your Lungs Out* is a community-based singing group for people with lung disease, with a weekly attendance rate of 85%.[6]

Patients who continue to smoke can be advised that they will still benefit from pulmonary rehabilitation and that the programme focus is on improving quality of life and outcomes, and anything they do towards this is a step in the right direction.

Local DHBs or branches of the Asthma and Respiratory Foundation may offer rehabilitation programmes that are tailored for Māori or Pacific patients.

Patients who decline offers of referral to rehabilitation programmes, e.g. those reluctant to participate in group activities, will still benefit from self-directed exercise programmes which can be supported in primary care (see below).

* The original group is based in Wellington, but groups are now forming in other areas around the country, see: **www.mrinz.ac.nz/pdfs/How_to_set_up_SYLO.pdf**

Offering the basics of pulmonary rehabilitation in primary care

In regions where rehabilitation programmes are not accessible or, if despite encouragement and facilitation, patients do not wish to participate in a group programme, health professionals can provide extended support to patients with COPD in primary care. Many practices will be unable to offer supervision of exercise, specialised dietary advice, counselling or physiotherapy, but patients can be assessed to determine an appropriate level and type of exercise, and be provided with lifestyle advice, support and encouragement. Some practitioners around the country are finding innovative ways to support patients with COPD in their communities, e.g. helping to facilitate kapa haka and swimming roopu (groups), and providing classes for patients to learn about COPD and meet others with the same condition.

Assessing exercise capacity

Before beginning an exercise regimen the patient should be assessed to determine what level of exercise is safe and appropriate.[1]

Exercise may not be safe for patients with a history of unstable cardiovascular disease, e.g. unstable angina, unstable pulmonary valve disease, aortic valve disease.[7] Patients with musculoskeletal conditions, severe peripheral vascular disease or neurological disorders may have a limited ability to exercise; this can be discussed with a physiotherapist.

Establish a baseline of functional capacity

The patient's baseline level of fitness is used to measure improvements in functional capacity. The simplest way to assess this is to ask the patient to report their level of symptom severity when performing an everyday activity, e.g. walking to the end of the driveway. Improvements in symptoms with the same exercise can then be recorded at follow-up consultations.

In formal pulmonary rehabilitation programmes, the distance a patient is able to walk on a flat, hard surface in six minutes is often used as a standardised measure of functional capacity. The patient's progress can then be measured as they participate in the exercise programme and increase the distance they can walk in this time.

Start low, go slow…but GO!

Encourage the patient to think of an exercise that is enjoyable, can be easily incorporated into their day and is tailored to their level of activity, e.g. going for a morning walk, parking a block away, going to a swimming pool, doing grocery shopping. Patients can progressively extend the length of time that they exercise for as their fitness improves. An ideal goal is to exercise for 30 minutes a day, four to five times per week,[8] but this may not be realistic for all patients.

Green prescriptions can provide patients with an exercise facilitator who will encourage physical activity via phone calls and face-to-face meetings. See: **www.health.govt.nz/our-work/preventative-health-wellness/physical-activity/green-prescriptions/green-prescription-contacts**

Walking is the first-line exercise for all patients with COPD

All pulmonary rehabilitation programmes should include lower limb endurance training.[8] Walking is an ideal activity as it can be incorporated into daily routines, does not require any special equipment or cost and results in real-life functional improvements for the patient, e.g. being able to make it around the whole supermarket.[8] Cycling, or using an exercise bike, is another good example of lower limb endurance training, but may be less suitable.[8]

Upper limb endurance training should also be incorporated into the patient's exercise regimen.[8] This may also be more practical for patients with mobility issues and those with more severe disease who have difficulty walking due to shortness of breath. Repetitive upper limb exercises, e.g. lifting arms to shoulder height or above the head, also improves exercise capacity and is a movement that is used in daily living, e.g. hanging out the washing.[9]

Strength training increases the benefits of exercise

Patients are likely to gain greater benefits if they are able to include strength training two to three times per week in their exercise regimen, in addition to lower limb endurance training.[1]

Strength exercises typically comprise three sets of ten repetitions with less than two minutes rest between sets.[8] Stair climbing or going up and down a step will increase lower leg strength,[8] but this may be unrealistic for patients with reduced muscle mass. Upper limb exercises, e.g. bicep curls with a small weighted object such as a can, can be performed in a seated position with the back supported and the patient breathing in as they move their arms up and breathing out as they move their arms down.[8]

Examples of upper and lower body strength exercises for patients with COPD are available from **pulmonaryrehab.com.au/importance-of-exercise/exercise-prescription-and-training/strength-upper-limb/mode** and **pulmonaryrehab.com.au/importance-of-exercise/exercise-prescription-and-training/strength-lower-limb**

Managing breathlessness when exercising

It may be necessary for the patient to rest briefly while exercising. Breathing in through the nose and out through pursed lips can assist their recovery. The use of a wheeled walker may help those with severe breathlessness as this causes fixation of the shoulder girdle and a forward leaning posture, the combination of which can increase ventilatory capacity and walking distance.[10] Patients should be instructed to stop exercising if they experience dizziness, nausea or light-headedness and should seek medical assistance if they experience palpitations or chest, neck or arm pain of unknown origin.[8] Exercising within one to two hours of eating may lead to increased breathlessness in some patients.[8]

Teaching the active cycle of breathing

Pulmonary rehabilitation encompasses more than just exercise. Hypersecretion of mucus in the airways can cause coughing, which can be tiring and increase breathlessness for patients with more advanced COPD.[11] The active cycle of breathing is an efficient method of clearing sputum for patients with a productive cough.

The active cycle of breathing techniques includes breathing control, deep breathing and huffing, performed in a cycle for approximately ten minutes until the patient feels their chest is clear:[11]

1. **Breathing control** – patients breathe in and out through their nose, using as little effort as possible. Pursed lip breathing may help patients who cannot breathe through their nose. Breathing should gradually slow as tension in the body reduces; patients may find closing their eyes helps.
2. **Deep breathing** – patients take one long, slow, deep inhalation, through their nose if possible, while their chest and shoulders are relaxed. This is followed by a slow exhalation, like a long sigh. This should be repeated three to five times. Patients may find holding their breath for two to three seconds before each exhalation helps.
3. **Breathing control** – repeat before moving onto huffing
4. **Huffing** – patients exhale quickly through an open mouth. Patients can be told to breathe like they wish to "mist up" a mirror or their glasses. The technique should not cause wheezing or chest tightness. Small huffs with a long exhale, until the lungs are empty, are performed first to move sputum deep in the lungs. Big huffs with a short and rapid exhale are then performed to remove sputum from the airways once the patient feels the sputum is ready to move. Huffing should make the patient feel like their chest is rumbling or rattling. Although this is intended to circumvent the need for coughing, some patients may still need to cough. The cycle is then repeated, starting again at number one with breathing control.

The breathing control and deep breathing techniques can also be helpful for patients during a period of anxiety and breathlessness.

Breathing techniques may be performed when patients are seated or in a position of postural drainage, e.g. lying down if secretions are in the lower lungs or propped up to clear secretions in the upper airways. Maintaining good oral hydration may help reduce the viscosity of mucus and allow for easier sputum clearance.

An instructional video on the active cycle of breathing is available from: **www.youtube.com/watch?v=XvorhwGZGm8**

Patient education is an important part of rehabilitation

Respiratory education is an ongoing process for patients with COPD, and health professionals are encouraged to expand an aspect of the patient's knowledge at every consultation. It is important that patients understand that interventions they can undertake themselves, such as smoking cessation and regular exercise can reduce their symptoms and increase their quality of life, and can be just as important as the medicines they take. Ideally, inhaler technique and treatment adherence should be assessed at every consultation to ensure patients are receiving the maximum benefit.[12] Education should also cover topics such as COPD terminology, basic pathophysiology, pharmacological treatments, how to manage an exacerbation, when to seek help and nutritional advice.

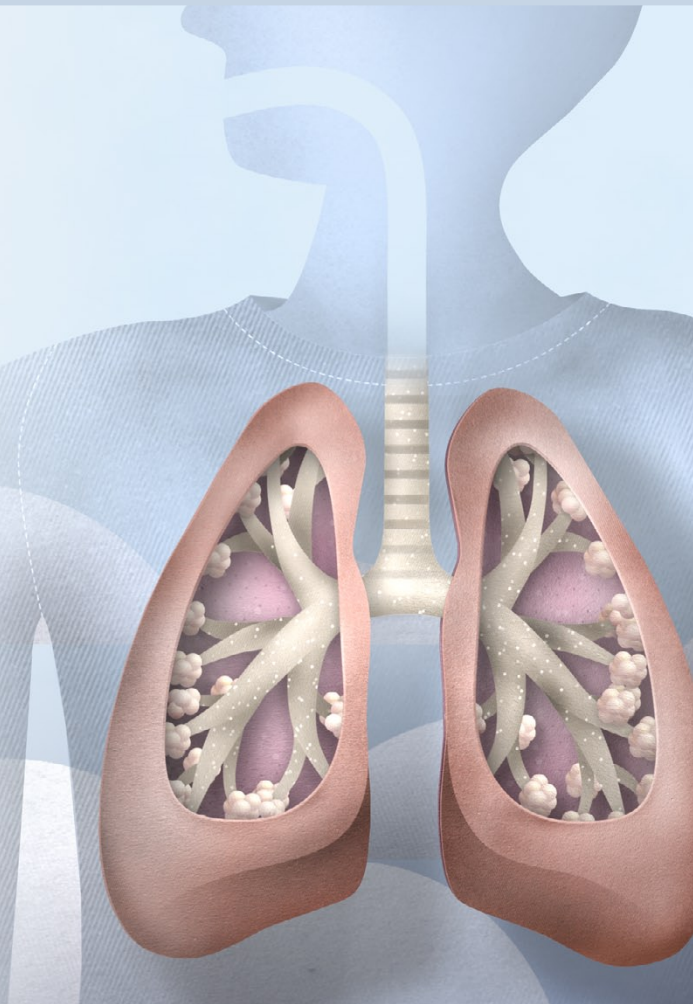
Further reading

General practices who are interested in developing their own pulmonary rehabilitation programmes can access the Pulmonary Rehabilitation Toolkit: **www.pulmonaryrehab.com.au/**

For information on the pharmacological management of COPD, see: "The optimal management of patients with COPD – Part 2: Stepwise escalation of treatment", available from: **www.bpac.org.nz/BPJ/2015/February/copd-part2.aspx**

A podcast on the non-pharmacological management of COPD is available from: **www.goodfellowunit.org/podcast/non-pharmacological-management-copd-fiona-horwood**

The Asthma and Respiratory Foundation NZ offer an online training course on the fundamentals of asthma and COPD for health professionals, see: **https://cpd.whitireia.ac.nz/local/moodec/pages/product.php?id=8**



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