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Pulmonary rehabilitation improves exercise capacity and quality of life

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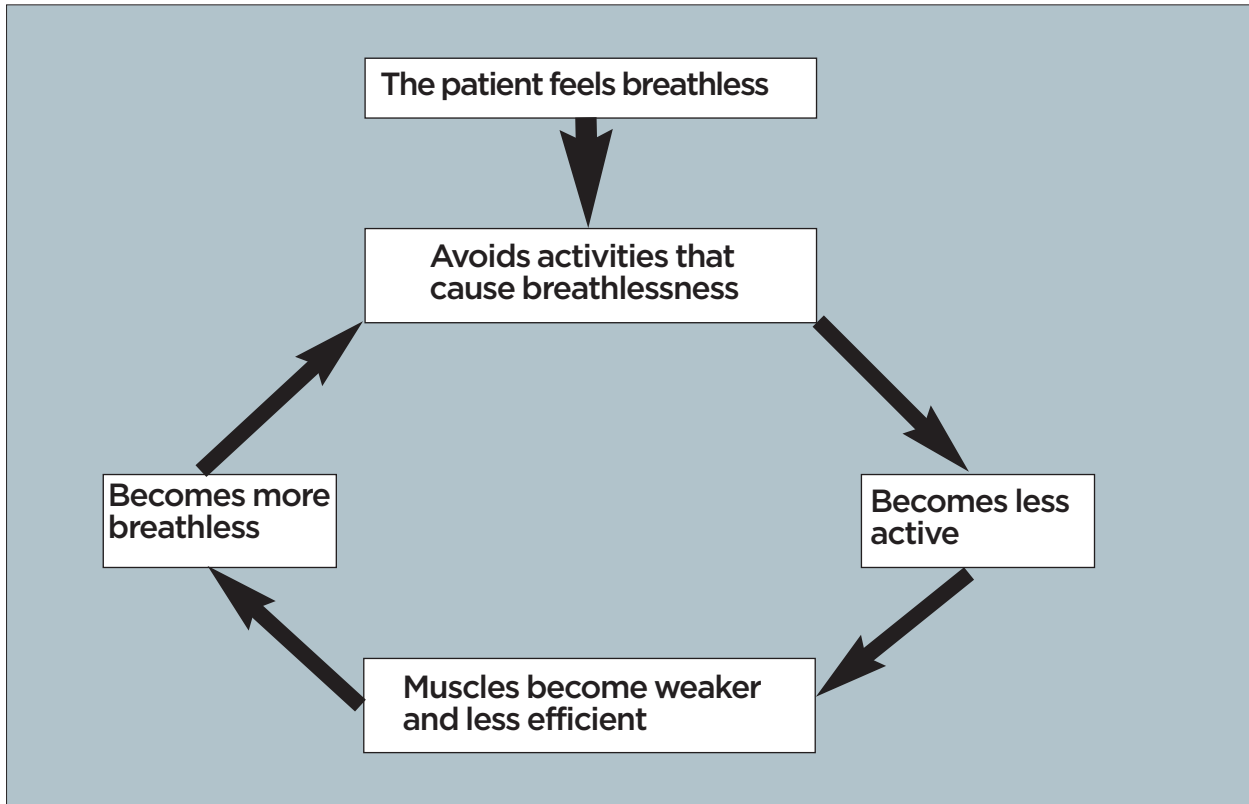


FIGURE 1

The cycle of deconditioning in patients with breathlessness

What are the benefits of pulmonary rehabilitation?



PULMONARY REHABILITATION IS A MULTIFACETED PROGRAMME OF EXERCISE AND EDUCATION THAT AIMS

to improve breathlessness, exercise capacity, and quality of life, and aid self-management.

A large research evidence base exists supporting the efficacy of pulmonary rehabilitation; predominantly in chronic obstructive pulmonary disease (COPD) but also in a wide variety of other respiratory conditions.

There are an estimated 446,000 patients in England and Wales with COPD and MRC grade 3 dyspnoea or worse.¹ The vast majority of patients with COPD have access to rehabilitation but the 2015 national audit of pulmonary rehabilitation in England and Wales demonstrated shortfalls in coverage, timely delivery and completion of

What are the core components of a programme?

courses. During the audit period there were an estimated 68,000 referrals to pulmonary rehabilitation for patients with COPD² but only 42% completed the programme.³

The 2013 British Thoracic Society (BTS) guideline⁴ defined pulmonary

‘Supervised exercise is an ideal setting to assess the efficiency of an individual’s breathing pattern and explain how this may be improved’

Which patients are eligible for referral?

rehabilitation as ‘an interdisciplinary programme of care for patients with chronic respiratory impairment that is individually tailored and designed to optimise each patient’s physical and social performance and autonomy. Programmes comprise individualised exercise programmes and education.’

Patients with COPD and other chronic respiratory diseases lose muscle mass and function and the ensuing weakness and deconditioning contributes to breathlessness, see figure 1, above. Moreover, disease exacerbations are associated with increased systemic inflammation, a further reduction in disease activity and sometimes prescription of therapies which can contribute to muscle weakness, such as oral corticosteroids.

Standard training involves aerobic endurance training primarily focusing on >>

SYMPOSIUM CARE OF THE ELDERLY

PULMONARY REHABILITATION

the lower limbs but also incorporating some upper limb muscle exercise. Training intensity should start at a minimum of 60% of peak workload established on the initial exercise test, although many programmes would commence at 65-75%. As the programme progresses both the duration and intensity of training increase.

Many programmes also incorporate resistance (strength) training to improve lower limb, especially quadriceps, muscle strength; so baseline strength measurement is important. Interval training may be as effective but typically requires a higher staff to patient ratio and may therefore not be as cost effective.

Supervised exercise is an ideal setting to assess the efficiency of an individual's breathing pattern and explain how this may be improved.

Most rehabilitation programmes deliver twice weekly supervised sessions over a period of at least six weeks (a minimum of 12 sessions) and while some individuals may gain benefit from fewer sessions it is vital that the programme carefully and continuously assesses outcomes.

REFERRAL

One of the great advantages of pulmonary rehabilitation is its broad applicability to individuals with a wide range of cardiorespiratory conditions. The exclusions are modest and primarily focus on those with severe locomotor deficits that preclude exercise, e.g. severe arthritis and significant peripheral vascular disease, and patients with unstable cardiac disease, e.g. unstable angina. An individual with an abdominal aortic aneurysm < 5.5 cm

with good blood pressure control can complete rehabilitation using moderate intensity exercise. Patients with severe cognitive or psychiatric impairment need to be assessed carefully although the presence of a carer during training can be beneficial.

Age and smoking should never preclude access to pulmonary rehabilitation. Individuals with chronic respiratory failure, those on long-term or ambulatory oxygen and patients with anxiety and depression can all benefit from rehabilitation.

'Age should never preclude access to pulmonary rehabilitation'

Pulmonary rehabilitation is effective where there is functional limitation caused by breathlessness and outpatient training programmes work in patients with milder (MRC dyspnoea grade 2) and more severe breathlessness (grade 5).⁵ However, people with lesser degrees of breathlessness will require a higher training level and this may be better delivered in another setting such as a gym or fitness centre.

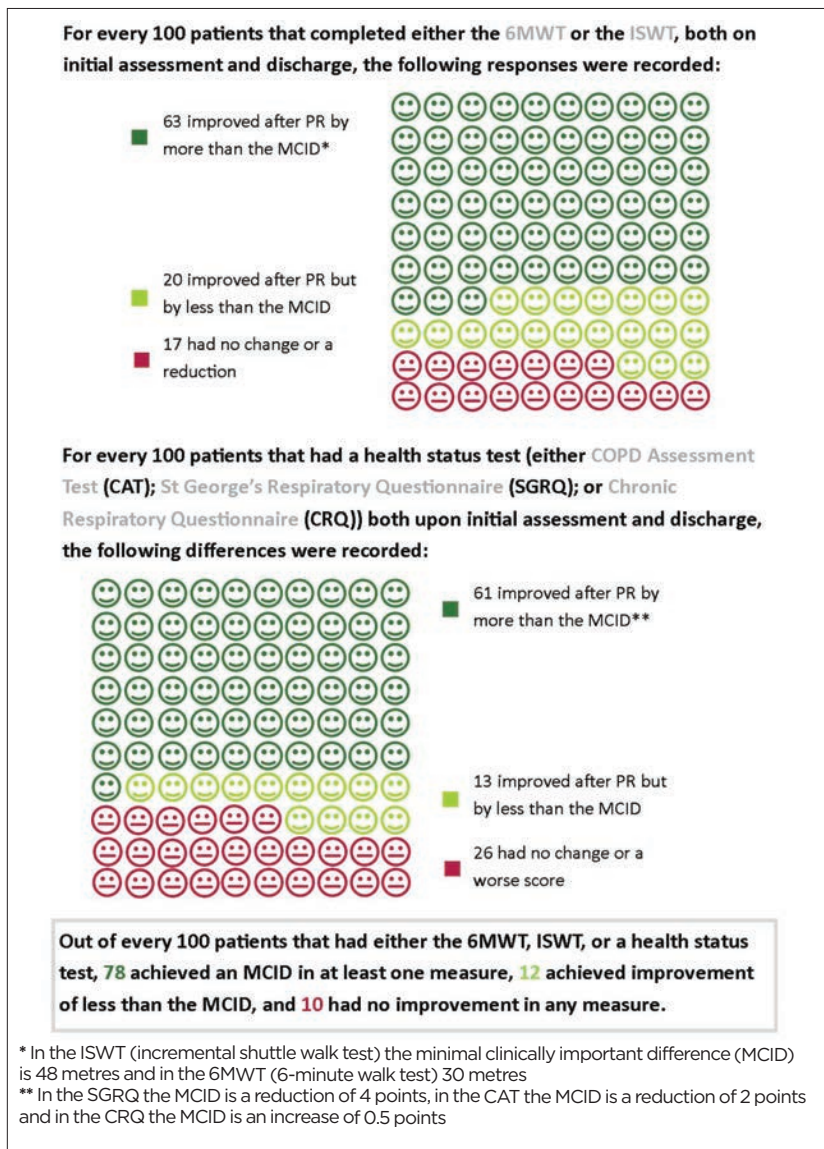
Pulmonary rehabilitation is one of the most beneficial and cost-effective treatments for patients with COPD as shown in the London Respiratory Network COPD Value Pyramid.⁶ However, when exercise training is recommended to patients with significant breathlessness the initial response is often surprise and rejection.

'Pulmonary rehabilitation is one of the most beneficial and cost-effective therapies for COPD'

It is vital that time is taken at the outset to explain why pulmonary rehabilitation works, to reassure patients that they will be carefully assessed and discuss the controlled nature of training and the proven effectiveness. Negative first impressions can be very challenging to overcome later on.

Pulmonary rehabilitation should be considered a fundamental component of disease management rather than an optional treatment.

FIGURE 2
Exercise assessment and health status outcomes for patients with COPD who participated in the 2015 England and Wales pulmonary rehabilitation audit³



key points

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Pulmonary rehabilitation is a multifaceted programme

of exercise and education that aims to improve breathlessness, exercise capacity, and quality of life, and aid self-management. Standard training involves aerobic endurance training primarily focusing on the lower limbs but also incorporating some upper limb muscle exercise. Many programmes also incorporate resistance (strength) training to improve lower limb, especially quadriceps, muscle strength. Supervised exercise is an ideal setting to assess the efficiency of an individual's breathing pattern and explain how this may be improved.

Pulmonary rehabilitation has broad applicability to

individuals with a wide range of cardiorespiratory conditions, exclusions are modest and primarily focus on patients with severe locomotor deficits. Patients with chronic respiratory failure, those on long-term or ambulatory oxygen and patients with anxiety and depression can all benefit from rehabilitation. It is one of the most beneficial and cost-effective treatments for COPD and should be considered a fundamental component of disease management rather than an option.

A standard assessment visit will include two walking

tests, completion of health status questionnaires, often an assessment of anxiety and depression and of lower limb muscle strength if resistance training is to be used. Most rehabilitation programmes deliver twice weekly supervised sessions over a period of at least six weeks. The initial assessment provides an opportunity to explain the nature of the programme, reassure the patient and address any outstanding questions and concerns. Education is a vital component of any rehabilitation programme. It is important to emphasise the benefits of keeping active and maintaining a healthy lifestyle. Comorbidity, smoking, and anxiety and depression can be addressed where appropriate. Pulmonary rehabilitation is more effective when inhaler therapy is optimised; both inhaler technique and the prescription.

Meta-analyses of clinical trials show that pulmonary

rehabilitation reduces breathlessness and fatigue, improves exercise capacity, activity, quality of life, and autonomy. The benefits are large and highly clinically significant. There is strong evidence that patients with COPD who complete pulmonary rehabilitation have an overall reduction in subsequent exacerbation and hospitalisation rates. Patients hospitalised with acute exacerbations of COPD should be referred for pulmonary rehabilitation at discharge and enrolled within one month of leaving hospital.

The biggest challenge to improve pulmonary

rehabilitation outcomes is to improve uptake and completion. The 2015 national audit in England and Wales found that 69% of patients attended the initial assessment, 59% enrolled but only 42% of those referred completed the programme.

ASSESSMENT AND GOAL SETTING

The initial assessment provides an opportunity to explain the nature of the programme, reassure the patient and address any outstanding questions and concerns.

Education is a vital component of any rehabilitation programme. It is important to emphasise the benefits of keeping active and maintaining a healthy lifestyle. Comorbidity, cigarette smoking, and anxiety and depression can be addressed where appropriate. Pulmonary rehabilitation is more effective when inhaler therapy is optimised; both inhaler technique and the prescription. The visit provides the opportunity to determine if an individual needs to exercise using oxygen, and whether additional staff support is required.

'Meta-analyses of clinical trials have shown that pulmonary rehabilitation reduces breathlessness and fatigue ...

A standard assessment visit will include two walking tests (a practice test and the formal assessment), completion of health status questionnaires, often an assessment of anxiety and depression and an assessment of lower limb muscle strength if resistance training is to be used. These assessments are then used to prescribe an individual exercise programme.

There is evidence that goal setting can help contextualise training and provide a focus for those starting a pulmonary rehabilitation programme.

BENEFITS COPD

Pulmonary rehabilitation has a robust evidence base and the majority of individuals completing a programme should expect to improve their exercise capacity and quality of life beyond the minimal clinically important difference (MCID) of the assessment measures.

Figure 2, p18, shows the outcomes demonstrated in the 2015 national audit which represents 'real world' practice rather than a research trial. The audit

included 7,413 patients with COPD, 53% of whom were men and the mean age was 69 years. In patients completing the 6-minute walk test or incremental shuttle walk test, nearly two-thirds (63%) of patients improved by more than the MCID, 20% showed some improvement but less than the MCID, and 17% showed no change or a reduction in walking distance.

Overall, 78% of patients completing rehabilitation achieved an MCID in exercise capacity, health status or both; 12% improved by less than the MCID and 10% showed no improvement. The results of the 2017 audit will be published later this year.

Meta-analyses of clinical trials have shown that pulmonary rehabilitation reduces breathlessness and fatigue and improves exercise capacity, activity, quality of life and autonomy. The benefits are large and highly clinically significant. The Cochrane pulmonary rehabilitation outcomes meta-analysis included 65 trials and 3,822 participants. Mean change in health status using the St George's Respiratory Questionnaire was 6.9 points (95% CI: 4.5-9.3) where the MCID for the test is a reduction of 4 points. Mean improvement in walking distance on the 6-minute walking test was 44 metres (95% CI: 33-55) where the MCID is 30 metres.⁷

There is strong evidence that patients with COPD who complete pulmonary rehabilitation have an overall reduction in subsequent exacerbation and hospitalisation rates. The Cochrane meta-analysis included eight trials and 880 participants. The pooled odds ratio for reduction of subsequent admission was OR 0.44 (95% CI: 0.21-0.91).⁸

... and improves exercise capacity, activity, quality of life and autonomy'

Early pulmonary rehabilitation delivered a short time after an exacerbation of COPD is also effective⁹ and is one of the ten pulmonary rehabilitation quality standards recommended by the BTS.¹⁰ Patients hospitalised with acute exacerbations of COPD should be referred for pulmonary rehabilitation at discharge and enrolled within one month of leaving hospital. Assessment for pulmonary rehabilitation is a core component of the BTS Discharge Care Bundle¹¹ with the latter one of the two »

components of the COPD Best Practice Tariff.

There remains debate as to the appropriateness of early rehabilitation commenced as soon as possible during COPD hospitalisation after a large randomised controlled trial showed higher one-year mortality in the treatment group, albeit this difference was not seen until five months or later after the intervention.¹² Many senior rehabilitation specialists believe the negative trial finding is unrelated to the initial intervention in light of the late timeline.¹³ The 2017 European Respiratory Society/American Thoracic Society Guideline recommended commencement of pulmonary rehabilitation within three weeks of discharge from hospital.¹⁴

Other conditions

There is evidence for the benefit of pulmonary rehabilitation programmes in bronchiectasis, interstitial lung disease and asthma. Exercise training can assist recovery from treatment for lung cancer and there is a growing evidence base for the usefulness of exercise training in the management of patients with other types of cancer. There is considerable overlap between rehabilitation services for chronic respiratory disease and heart failure and it is possible to deliver the exercise component to patients with either condition in one group, although some of the education components would differ.¹⁵

IMPROVING OUTCOMES

The biggest challenge to improve pulmonary rehabilitation outcomes is to improve uptake and completion. In the 2015 national audit, 69% of patients referred attended the initial assessment and 59% enrolled on the programme, but only 42% completed rehabilitation. More detailed explanations and better information may have improved uptake rates. The location of the programme and transport and parking charges are frequently cited as barriers to better completion rates. Pulmonary rehabilitation can be organised as a series of consecutive groups (a cohort programme) or with continuous recruitment where people leave when they complete or drop out and are replaced by new participants (a rolling programme). One of the reasons for drop out during a programme is an exacerbation or hospitalisation and both this, and the short timeline for recruitment to early post-exacerbation pulmonary rehabilitation, are easier to manage with rolling rather than cohort delivery.

It is imperative that any programme continually assesses outcomes and, where possible, benchmarks their process and results against peers. Many of the assessment measures in the national COPD audit are based on the 2014 BTS Quality Standards.¹⁰ Benchmarked key outcomes will be published in the 2017 audit.

In April 2018, the Royal College of Physicians is launching a pulmonary rehabilitation accreditation programme with the aim of improving the quality of pulmonary rehabilitation services. This is based on successful pilots conducted with the BTS and the National COPD Audit Programme.¹⁶

Pulmonary rehabilitation is currently predominantly delivered face to face but it is recognised that some individuals and groups can achieve similar benefit from remote training where motivation is high and instruction is high quality. Use of web-based training and smart phone apps is already being examined and their role will become clearer in the near future.

CONCLUSIONS

Pulmonary rehabilitation is one of the most beneficial and cost-effective treatments for COPD and many other chronic respiratory conditions. Access to programmes has improved over the past 15 years but there are still variations in process and outcomes. Ways of best delivering services continue to be examined to improve completion rates and key outcomes.

Competing interests: None

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Useful information

British Lung Foundation
Information for patients about pulmonary rehabilitation
www.blf.org.uk

British Thoracic Society
The BTS 2013 pulmonary rehabilitation guideline and 2014 quality standards for pulmonary rehabilitation can both be accessed via the website
www.brit-thoracic.org.uk

We welcome your feedback

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