



This article has been modified from an ERS School Course held in Pisa, Italy in 2008. The original slides, webcast and material can be found at www.ers-education.org

Outpatient-based rehabilitation

Educational aims

- ▶ To provide an overview of the content of outpatient rehabilitation programmes.
- ▶ To explore the value of rehabilitation programmes of different lengths.
- ▶ To discuss issues of maintenance.
- ▶ To detail adjuncts to outpatientbased rehabilitation.

Summary

Reduction in physical activity and breathlessness are arguably the two most important features for patients with moderate-to-severe chronic obstructive pulmonary disease (COPD). Pulmonary rehabilitation (PR) has several objectives for patients with COPD, but in the context of this article the most relevant aim is the enhancement of physical training, and how this might be optimised.

▶ The value of exercise training for COPD is well established in the literature. The recent American Thoracic Society (ATS)/European Respiratory Society (ERS) statement [1] on PR endorsed this firmly, acknowledging that exercise is the cornerstone of this intervention. The prescription of the exercise regime has been hotly debated. The principle of "something is always better than nothing" prevailed and many rehabilitation programmes evolved with poorly controlled exercise regimes. However, evidence for a more accurate prescription has accumulated over the past decade.

The ATS/ERS guideline summarises the prescription for aerobic exercise as shown in the box on the next page.

Clinicians and researchers are now being encouraged to explore techniques that may complement the benefit of aerobic training. Most rehabilitation programmes put their efforts into continuous endurance programmes, which can be either cycling- or walking based. This includes manipulating the exercise regime, for example with interval training,

or alternatively directing the regime to match patients' aspirations specifically. Interval training requires individuals to follow a routine of high- and low-intensity training for a set period. This type of training may be more suitable for the severely limited patient, particularly if the individual demonstrates a ventilatory limit to exercise. This type of training can best be delivered on a cycle ergometer, and can be practically challenging without this equipment. In goal-directed training, the exercise regime is individualised and specifically matches the aspiration of the patient. In reality, it would seem that many patients would simply like to be able to walk further, and this should be achievable though a conventional endurance-based programme.

The recent guidelines suggest that an outpatient-based course of rehabilitation should last a minimum of 6–8 weeks. This length of course seems common across many parts of Europe and North America. It may be feasible to reduce or extend the length of the course of rehabilitation to achieve optimal

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Competing interests

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Provenance

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ATS/ERS practice guidelines for aerobic exercise training

1. A minimum of 20 sessions, three times per week, two supervised.
2. High intensity produces greater physiological benefit.
3. Interval training may be useful.
4. Both upper- and lower-limb extremity training should be used.
5. The combination of endurance and strength generally has multiple beneficial effects and is well tolerated.

Adapted from [1], with permission from the publisher.

results. Linked with the issue of how long the course of rehabilitation should be is the sustainability of the course and maintenance opportunities. There have been trials of various maintenance strategies, but as yet there is no clear winner!

A number of additional therapeutic interventions can be employed in the outpatient environment. These can range from supplemental oxygen therapy, strength training, nutritional intervention or walking aids. Strength training is prescribed from the initial assessment of a one-repetition maximum (1-RM), identifying the maximal force the muscle can generate. Strength training commences at 60–70% of the 1-RM, in 8–10 repetitions, for three sets separated by a 30-second rest. Studies have demonstrated that strength training can be achieved even in the frail elderly. The general consensus is that strength training alone is less effective at improving overall exercise capacity and health status. The benefit of strength training has been described, but

the most recent analysis of all studies indicates that maximum benefit is achieved with a combination of endurance and strength exercises. The sustainability of strength training has yet to be confirmed. The benefit of a short course (6–8 weeks) of endurance training seems to last for about 1 year [2]; however the length of time over which one would anticipate seeing continued benefits from a strength training course has not been evaluated thoroughly. Intuitively, it might be anticipated that exclusive strength training favourably influences domestic task completion; so far, however, this has not been reported.

A strategy employed for severely impaired patients is neuromuscular electrical stimulation. This therapy provokes an involuntary contraction, usually of the quadriceps muscle. The therapy is applied for 30 minutes per day for a period of up to 8 weeks. This technique has not been applied in large groups of COPD patients, but the trials conducted to date indicate it may be a very useful adjunct to rehabilitation. The treatment can be self-administered and therefore, potentially, can be used at home.

Other strategies to consider might include the addition of pharmaceutical therapies not already included in the patient's prescription. Although supplemental oxygen and dietary manipulation are outside the scope of this article, they may have important patient benefit and should be considered.

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