Abstract

Background
Ambulatory oxygen is defined as the use of supplemental oxygen during exercise and activities of daily living. Ambulatory oxygen therapy is often used for patients on long term oxygen therapy during exercise, or for non long term oxygen therapy users who achieve some subjective and/or objective benefit from oxygen during exercise. The evidence for the use of ambulatory oxygen therapy is extrapolated from two sources: longer term studies and single assessment studies. Longer term studies assess the impact of ambulatory oxygen therapy used at home during activities of daily living. Single assessment studies compare performance during an exercise test using oxygen with performance during an exercise test using placebo air.

Objectives
To determine the efficacy of ambulatory oxygen in patients with COPD using single assessment studies.

Search strategy
The Cochrane Airways Group COPD register was searched with predefined search terms. Searches were current as of March 2005.

Selection criteria
Only randomised controlled trials were included. Studies did not have to be blinded. Studies had to compare oxygen and placebo when administered to people with COPD who were undergoing an exercise test.

Data collection and analysis
Two reviewers (JB, B’ON) extracted and entered data in to RevMan 4.2.
Thirty one studies (contributing 33 data sets), randomising 534 participants met the inclusion criteria of the review. Oxygen improved all pooled outcomes relating to endurance exercise capacity (distance, time, number of steps) and maximal exercise capacity (exercise time and work rate). Data relating to VO₂ max could not be pooled and results from the original studies were not consistent. For the secondary outcomes of breathlessness, SaO₂ and Vₑ, comparisons were made at isotime. In all studies except two the isotime is defined as the time at which the placebo test ended. Oxygen improved breathlessness, SaO₂/PaO₂ and Vₑ at isotime with endurance exercise testing. There was no data on breathlessness at isotime with maximal exercise testing. Oxygen improved SaO₂/PaO₂ and reduced Vₑ at Isotime.

Authors' conclusions
This review provides some evidence from small, single assessment studies that ambulatory oxygen improves exercise performance in people with moderate to severe COPD. The results of the review may be affected by publication bias, and the small sample sizes in the studies. Although positive, the findings of the review require replication in larger trials with more distinct subgroups of participants. Maximal or endurance tests can be used in ambulatory oxygen assessment. Consideration should be given to the measurement of SaO₂ and breathlessness at isotime as these provide important additional information. We recommend that these outcomes are included in the assessment for ambulatory oxygen. Future research needs to establish the level of benefit of ambulatory oxygen in specific subgroups of people with COPD.

Plain language summary
Short-term studies indicate that people with chronic obstructive pulmonary disease respond to the administration of oxygen when they do exercise tests. Ambulatory oxygen is the use of supplemental oxygen during exercise and activities of daily living. One way to assess if ambulatory oxygen is beneficial for a patient with COPD is to compare the effects of breathing oxygen and breathing air on exercise capacity. Some people with COPD may benefit more than others, and trials should take account of whether people who do not already meet criteria for domiciliary oxygen also respond. This review shows that there is strong evidence that ambulatory oxygen (short-term) improves exercise capacity. Further research needs to focus on which COPD patients benefit from ambulatory oxygen, how much oxygen should be provided and the long-term effect of ambulatory oxygen.