Cochrane Database of Systematic Reviews - - Cochrane Review

Exercise versus airway clearance techniques for people with cystic fibrosis

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Study design (if review, criteria of inclusion for studies)

Randomised controlled trials

Participants

People with CF

Interventions

exercise compared to other airway clearance techniques

Outcome measures

Respiratory function; potential adverse effects

Main results

We included four RCTs. The 86 participants had a wide range of disease severity (forced expiratory volume in one second (FEV1) ranged from 54% to 95%) and were 7 to 41 years old. Two RCTs were crossâ€•over and two were parallel in design. Participants in one RCT were hospitalised with an acute respiratory exacerbation, whilst the participants in three RCTs were clinically stable. All four RCTs compared exercise either alone or in combination with another ACT, but these were too diverse to allow us to combine results. The certainty of the evidence was very low; we downgraded it due to low participant numbers and high or unclear risks of bias across all domains. Exercise versus active cycle of breathing technique (ACBT) One crossâ€•over trial (18 participants) compared exercise alone to ACBT. There was no change from baseline in our primary outcome FEV1, although it increased in the exercise group before returning to baseline after 30 minutes; we are unsure if exercise affected FEV1 as the evidence is very lowâ€•certainty. Similar results were seen for other measures of lung function. No adverse events occurred during the exercise sessions (very lowâ€•certainty evidence). We are unsure if ACBT was perceived to be more effective or was the preferred ACT (very lowâ€•certainty evidence). 24â€•hour sputum volume was less in the exercise group than with ACBT (secondary outcome). Exercise capacity, quality of life, adherence, hospitalisations and need for additional antibiotics were not reported. Exercise plus postural drainage and percussion (PD&P) versus PD&P only Two trials (55 participants) compared exercise and PD&P to PD&P alone. At two weeks, one trial narratively reported a greater increase in FEV1 % predicted with PD&P alone. At six months, the other trial reported a greater increase with exercise combined with PD&P, but did not provide data for the PD&P group. We are uncertain whether exercise with PD&P improves FEV1 as the certainty of evidence is very low. Other measures of lung function did not show clear evidence of effect. One trial reported no difference in exercise capacity (maximal work rate) after two weeks. No adverse events were reported (1 trial, 17 participants; very lowâ€•certainty evidence). Adherence was high, with all PD&P sessions and 96% of exercise sessions completed (1 trial, 17 participants; very lowâ€•certainty evidence). There was no difference between groups in 24â€•hour sputum volume or in the mean duration of hospitalisation, although the sixâ€•month trial reported fewer hospitalisations due to exacerbations in the exercise and PD&P group. Quality of life, ACT preference and need for antibiotics were not reported. Exercise versus underwater positive expiratory pressure (uPEP) One trial (13 participants) compared exercise to uPEP (also known as bubble PEP). No adverse events were recorded in either group (very lowâ€•certainty evidence). Trial investigators reported that participants perceived exercise as more fatiguing but also more enjoyable than bubble PEP (very lowâ€•certainty evidence). There were no differences found in the total weight of sputum collected during treatment sessions. The trial did not report the primary outcomes (FEV1, quality of life, exercise capacity) or the secondary outcomes (other measures of lung function, adherence, need for antibiotics or hospitalisations).

Authors' conclusions

As one of the top 10 research questions identified by clinicians and people with CF, it is important to systematically review the literature regarding whether or not exercise is an acceptable and effective ACT, and whether it can replace traditional methods. We identified an insufficient number of trials to conclude whether or not exercise is a suitable alternative ACT, and the diverse design of included trials did not allow for metaâ€•analysis of results. The evidence is very lowâ€•certainty, so we are uncertain about the effectiveness of exercise as an ACT. Longer studies examining outcomes that are important to people with CF are required to answer this question.

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See also

Heinz KD, Walsh A, Southern KW, Johnstone Z, Regan KH. Exercise versus airway clearance techniques for people with cystic fibrosis. Cochrane Database of Systematic Reviews 2022, Issue 6. Art. No.: CD013285. DOI: 10.1002/14651858.CD013285.pub2. Accessed 23 June 2022

Keywords

Acapella; Active Cycle of Breathing Technique -ACBT-; Aerobic training; Airway clearance drugs -expectorants- mucolytic- mucociliary-; Airway clearance technique; Autogenic drainage; Chest physiotherapy; Chest Wall Oscillation; Child; Combined Modality Therapy; Drainage; exercise; flutter; forced expiration technique; High Frequency Chest Wall Oscillation -HFCWO-; inspiratory muscle training; Intrapulmonary Percussive Ventilation; non pharmacological intervention - devices OR physiotherapy; non pharmacological intervention - psyco-soc-edu-org; oscillating devices; Percussion; pharmacological_intervention; Positive-Pressure Respiration- PEP- pep mask; Postural Drainage; Respiratory Tract Diseases; strength training; training; VEST Airway Clearance System; Vibration;