



Topic Exploration Report

Topic explorations are designed to provide a high-level briefing on new topics submitted for consideration by Health Technology Wales. The main objectives of this report are to:

1. Determine the quantity and quality of evidence available for a technology of interest.
2. Identify any gaps in the evidence/ongoing evidence collection.
3. Inform decisions on topics that warrant fuller assessment by Health Technology Wales.

Topic:	Oscillating positive expiratory pressure devices for airway clearance in chronic hypersecretory lung conditions
Topic exploration report number:	TER168

Introduction and aims

Oscillating positive expiratory pressure (OPEP) is an airway clearance technique (ACT) that can help clear mucus from the airways and lungs. When exhaling through an OPEP mouthpiece, the device gives resistance and vibrations that make it more difficult to breathe out. This helps to loosen and move mucus out of the lungs. After using the OPEP device, the user huff coughs to help clear the mucus from the body. Several OPEP devices are available in Wales.

Health Technology Wales researchers searched for evidence on OPEP devices for use in conditions where there is excessive production of mucus, or where mucus clearance is reduced. This includes, but is not limited to, cystic fibrosis, chronic obstructive pulmonary disease (COPD) or bronchiectasis.

Evidence

HTA assessments

Through our searches we identified an ongoing appraisal from the Scottish Health Technologies Group (SHTG): OPEP devices for chronic hypersecretory lung disease. Publication date for advice on this topic is not yet available.

Guidelines

We identified two NICE guidelines that refer to airway clearance techniques or positive expiratory pressure devices, but did not refer to oscillating variants specifically:

- NG115 COPD in over 16s: diagnosis and management (2018) recommends that people with stable COPD and excessive sputum should be taught how to use positive expiratory pressure devices and active cycle breathing techniques; physiotherapy using positive

expiratory pressure devices should be considered for selected people with exacerbations of COPD.

- NG78 Cystic fibrosis: diagnosis and management (2017) recommends that when choosing an airway clearance technique, to assess the person's ability to clear mucus from their lungs and offer an individualised plan to optimise this. The guidelines also states that preferences and adherence factors should be taken into account.

The British Thoracic Society guideline for bronchiectasis in adults (2018) recommends that active cycle of breathing techniques or OPEP should be offered to individuals with bronchiectasis.

Systematic reviews

We identified several systematic reviews that studied OPEP for either cystic fibrosis, COPD or bronchitis.

Two studies reported compared OPEP against either non-oscillating PEP (McIlwaine 2019) or other ACTs (Lee 2015). Both reviews concluded that there was little to no difference in outcomes between OPEP and other ACTs (included non-oscillating PEP), but the intervention was better than no treatment.

One review gave an overview of systematic reviews on ACTs for cystic fibrosis (Wilson 2019). The authors concluded that there was little evidence to support one ACT over another, and that the individual should choose an ACT that best meets their needs. The systematic reviews were of good quality, but the level of bias in the included trials was not clear.

Some reviews grouped OPEP with other interventions: three compared positive expiratory pressure therapy (both oscillating and non-oscillating) with other ACTs (Lee 2017; Lee 2015; Osadnik 2012); one compared oscillating devices (OPEP and chest wall oscillation) versus other ACTs (Morrison 2017); two reviews compared chest therapy (including OPEP) versus no chest therapy (Warnock 2015; Ides 2011); one study compared conventional chest therapy with other ACTs (Main 2005). Overall they suggest that ACTs are effective compared to no ACT, and that PEP-based therapies have similar or slightly improved efficacy compared to non-PEP therapies. However, there was a lack of long-term data, and studies were often reported as low or uncertain in quality. Further evaluation of the evidence is required to determine if OPEP subgroup analysis is reported.

Economic evidence

We identified two economic studies assessing the cost effectiveness for OPEP (Thanh 2019; Khoudigian-Sinani 2017). Both were Canadian studies that focussed on a specific OPEP model (Aerobika) for COPD exacerbations. Both studies reported cost-savings of OPEP versus no treatment; however, analysis against other OPEP devices or ACTs were not included.

Areas of uncertainty

We identified evidence for either cystic fibrosis, COPD or bronchiectasis. It is uncertain whether generalising the evidence for all chronic hypersecretory conditions would be appropriate at this stage, or whether each indication should be considered independently.

The topic proposer states that there are multiple OPEP devices available. We did not identify any secondary evidence that allowed comparisons between OPEP devices. It is unclear whether the devices are similar or include unique features, and whether it would be appropriate to consider them as a class product. Should it not be appropriate, a full assessment would be

required to establish the level of evidence for different OPEP devices or whether primary comparative evidence is available.

The evidence we identified included various different comparators. Should this topic proceed to full assessment, the project protocol may need to refine to the most relevant comparators to make a rapid review feasible.

The majority of secondary evidence we identified grouped OPEP with other ACTs. Full evaluation of the evidence is required to establish which (if any) of these systematic reviews report OPEP alone, and whether it would appropriate to extract or adapt this data for the current topic.

Conclusions

OPEP devices for chronic hypersecretory lung conditions are being assessed as part of the SHTG health technology appraisal work programme. We identified two systematic reviews comparing OPEP to either non-oscillating PEP devices or other ACTs. We also identified substantial secondary evidence that evaluated ACTs or other techniques, where comparisons against OPEP specifically are not reported, but extraction of the original primary studies may be possible. We also identified economic evidence that could potentially inform cost-effectiveness assessment and analysis.

Brief literature search results

Resource	Results
HTA organisations	
Healthcare Improvement Scotland	<p>We did not identify any relevant evidence or advice from this source. However, the Scottish Health Technologies Group (SHTG) have the topic on their ongoing work programme:</p> <p>Oscillatory Positive Expiratory Pressure (OPEP) Devices used for airway clearance in chronic hypersecretory lung disease, e.g. cystic fibrosis, bronchiectasis, COPD. Publication date TBC. http://www.healthcareimprovementscotland.org/our_work/technologies_and_medicines/shtg/shtg_work_programme.aspx</p>
Health Technology Assessment Group	We did not identify any relevant evidence or advice from this source.
Health Information and Quality Authority	We did not identify any relevant evidence or advice from this source.
UK guidelines and guidance	
SIGN	We did not identify any relevant evidence or advice from this source.
NICE	<p>Cystic fibrosis: diagnosis and management. NICE guideline [NG78]. October 2017. Airway clearance techniques (1.6.11 to 1.6.16). Discussions technique provision for people with cystic fibrosis but does not mention OPEP specifically. 1.6.13 <i>When choosing an airway clearance technique for people with cystic fibrosis:</i></p> <ul style="list-style-type: none"> • <i>assess their ability to clear mucus from their lungs, and offer an individualised plan to optimise this</i> • <i>take account of their preferences and (if appropriate) those of their parents and carers</i> • <i>take account of any factors that may influence adherence.</i> <p>Chronic obstructive pulmonary disease in over 16s: diagnosis and management. NICE guideline [NG115]. December 2018 (last updated July 2019). Managing stable COPD - Physiotherapy (1.2.99) <i>If people have excessive sputum, they should be taught:</i></p> <ul style="list-style-type: none"> • <i>how to use positive expiratory pressure devices</i> • <i>active cycle of breathing techniques. [2004, amended 2018]</i> <p>Managing exacerbations of COPD - Respiratory physiotherapy and exacerbations (1.3.36) <i>Consider physiotherapy using positive expiratory pressure devices for selected people with exacerbations of COPD, to help with clearing sputum. [2004, amended 2018]</i></p>
Secondary literature and economic evaluations	
EUnetHTA	We did not identify any relevant evidence from this source.

<p>Cochrane library</p>	<p>Lee AL, Burge AT, Holland AE. (2017). Positive expiratory pressure therapy versus other airway clearance techniques for bronchiectasis. Cochrane Database of Systematic Reviews. (9). doi: 10.1002/14651858.CD011699.pub2. http://dx.doi.org/10.1002/14651858.CD011699.pub2</p> <p>Main E, Prasad A, van der Schans CP. (2005). Conventional chest physiotherapy compared to other airway clearance techniques for cystic fibrosis. Cochrane Database of Systematic Reviews. (1). doi: 10.1002/14651858.CD002011.pub2. http://dx.doi.org/10.1002/14651858.CD002011.pub2</p> <p>McIlwaine M, Button B, Nevitt SJ. (2019). Positive expiratory pressure physiotherapy for airway clearance in people with cystic fibrosis. Cochrane Database of Systematic Reviews. (11). doi: 10.1002/14651858.CD003147.pub5. http://dx.doi.org/10.1002/14651858.CD003147.pub5</p> <p>Morrison L, Milroy S. (2017). Oscillating devices for airway clearance in people with cystic fibrosis. Cochrane Database of Systematic Reviews. (5). doi: 10.1002/14651858.CD006842.pub4. http://dx.doi.org/10.1002/14651858.CD006842.pub4</p> <p>Osadnik CR, McDonald CF, Jones AP, et al. (2012). Airway clearance techniques for chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews. (3). doi: 10.1002/14651858.CD008328.pub2. http://dx.doi.org/10.1002/14651858.CD008328.pub2</p> <p>Wilson LM, Morrison L, Robinson KA. (2019). Airway clearance techniques for cystic fibrosis: an overview of Cochrane systematic reviews. Cochrane Database of Systematic Reviews. (1). doi: 10.1002/14651858.CD011231.pub2. http://dx.doi.org/10.1002/14651858.CD011231.pub2</p>
<p>Medline</p>	<p>Warnock L, Gates A. (2015). Chest physiotherapy compared to no chest physiotherapy for cystic fibrosis. Cochrane Database of Systematic Reviews. (12): CD001401. https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD001401.pub3/full</p> <p>Ides K, Vissers D, De Backer L, et al. (2011). Airway clearance in COPD: need for a breath of fresh air? A systematic review. COPD: journal of chronic obstructive pulmonary disease. 8(3): 196-205. https://doi.org/10.3109/15412555.2011.560582</p> <p>Lee AL, Williamson HC, Lorensini S, et al. (2015). The effects of oscillating positive expiratory pressure therapy in adults with stable non-cystic fibrosis bronchiectasis: A systematic review. Chronic Respiratory Disease. 12(1): 36-46. https://doi.org/10.1177/1479972314562407</p> <p>Thanh NX, Jacobs P, Suggett J, et al. (2019). Cost-Effectiveness of the Aerobika R Oscillating Positive Expiratory Pressure Device in the Management of Chronic Obstructive Pulmonary Disease Exacerbations in Canada. Canadian Respiratory Journal. 2019: 9176504. https://doi.org/10.1155/2019/9176504</p>

	<p>Khoudigian-Sinani S, Kowal S, Suggett JA, et al. (2017). Cost-effectiveness of the Aerobika oscillating positive expiratory pressure device in the management of COPD exacerbations. <i>International Journal of Copd</i>. 12: 3065-73. https://doi.org/10.2147/COPD.S143334</p>
Other	
Additional evidence from the topic proposer	<p>Thompson CS, Harrison S, Ashley J, et al. (2002). Randomised crossover study of the Flutter device and the active cycle of breathing technique in non-cystic fibrosis bronchiectasis. <i>Thorax</i>. 57(5): 446-8. doi: 10.1136/thorax.57.5.446. https://thorax.bmj.com/content/thoraxjnl/57/5/446.full.pdf</p> <p>British Thoracic Society. Bronchiectasis (non-CF) Guideline Group. Guideline for non-CF Bronchiectasis (2010). (<i>Guideline Archived - "content/recommendations have not been checked to confirm continued validity at the date of archival and readers should bear in mind that new evidence may have been published since the Guideline was produced"</i>)</p>
Other relevant guidelines from the British Thoracic Society	<p>British Thoracic Society. Bronchiectasis in Adults Guideline Development Group. Guideline for Bronchiectasis in Adults (2018)</p> <p><i>Which airway clearance techniques should be taught?</i></p> <p><i>Recommendations</i></p> <ul style="list-style-type: none"> • Offer active cycle of breathing techniques or oscillating positive expiratory pressure to individuals with bronchiectasis. (D) • Consider gravity assisted positioning (where not contraindicated) to enhance the effectiveness of an airway clearance technique. (D)

Date of search:	January 2020
Concepts used:	PEP, OPEP, positive expiratory pressure, oscillating positive expiratory pressure, cystic fibrosis, COPD, bronchiectasis