

CADTH Reference List

Mechanical Percussion

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Authors: Lindsay Ritchie, Jennifer Horton

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Key Messages

- We found 2 randomized controlled trials about the clinical effectiveness of mechanical percussion for patients with excessive bronchial secretions.
- We did not find any studies on the cost-effectiveness of mechanical percussion for patients with excessive bronchial secretions.
- We did not find any evidence-based guidelines informing the use of mechanical percussion for patients with excessive bronchial secretions.

Research Questions

1. What is the clinical effectiveness of mechanical percussion for patients with excessive bronchial secretions?
2. What is the cost-effectiveness of mechanical percussion for patients with excessive bronchial secretions?
3. What are the evidence-based guidelines informing the use of mechanical percussion for patients with excessive bronchial secretions?

Methods

Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including MEDLINE, the Cochrane Database of Systematic Reviews, the International HTA Database, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concept was mechanical percussion. No filters were applied to limit the retrieval by study type. An additional search was done for excessive bronchial secretion, and CADTH-developed search filters were applied to limit retrieval to guidelines. Where possible, retrieval was limited to the human population. The search was completed on November 8, 2022 and limited to English-language documents published since January 1, 2012. Internet links were provided, where available.

Selection Criteria

One reviewer screened literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in [Table 1](#). Full texts of study publications were not reviewed. Open access full-text versions of evidence-based guidelines were reviewed when available.

Table 1: Selection Criteria

Criteria	Description
Population	Patients with conditions causing excessive bronchial secretions (e.g., respiratory conditions such as cystic fibrosis, chronic obstructive pulmonary disease; neuromuscular conditions such as amyotrophic lateral sclerosis)
Intervention	Mechanical percussion (i.e., hand-held electrical devices)
Comparator	Q1 and Q2: Manual percussion, no comparator Q3: Not applicable
Outcomes	Q1: Clinical benefits (i.e., clearance of the airway, reduced hospital admissions, reduced use of health care resources, quality of life) and harms (e.g., fracture or other injury caused by percussion) Q2: Cost-effectiveness (i.e., cost per quality-adjusted life-year gained, incremental cost-effectiveness ratios) Q3: Evidence-based recommendations informing the use of mechanical percussion
Study designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, economic evaluations, evidence-based guidelines

Results

Two randomized controlled trials^{1,2} were identified regarding the clinical effectiveness of mechanical percussion for patients with excessive bronchial secretions. No relevant health technology assessments, systematic reviews, non-randomized studies, economic evaluations, or evidence-based guidelines were identified.

Additional references of potential interest that did not meet the inclusion criteria are provided in [Appendix 1](#).

References

Health Technology Assessments

No literature identified.

Systematic Reviews

No literature identified.

Randomized Controlled Trials

1. Hue YL, Lum LCS, Ahmad SH, et al. Safety, tolerability and efficacy of LEGA-Kid R mechanical percussion device versus conventional chest physiotherapy in children: a randomised, single-blind controlled study. *Singapore Med J.* 2022; 63(2): 105-110. [PubMed](#)
2. Punithavathi N, Ong LM, Irfhan Ali HA, et al. A Pilot Randomized Control Cross over Study Evaluating the Effectiveness and Safety of Mechanical Percussor Compared with Conventional Chest Physiotherapy in Adults with Productive Cough. *Med J Malaysia.* 2014; 69(1): 16-20. [PubMed](#)

Non-Randomized Studies

No literature identified.

Economic Evaluations

No literature identified.

Guidelines and Recommendations

No literature identified.

Appendix 1: References of Potential Interest

Systematic Reviews

Unclear Intervention – Airway Clearance Techniques or Chest Physiotherapy

Wilson LM, Morrison L, Robinson KA. Airway clearance techniques for cystic fibrosis: an overview of Cochrane systematic reviews. *Cochrane Database Syst Rev*. 2019; 1(1): CD011231. [PubMed](#)

Hill AT, Barker AF, Bolser DC, et al. Treating Cough Due to Non-CF and CF Bronchiectasis With Nonpharmacological Airway Clearance: CHEST Expert Panel Report. *Chest*. 2018; 153(4): 986-993. [PubMed](#)

Roque i Figuls M, Gine-Garriga M, Granados Rugeles C, Perrotta C, Vilaro J. Chest physiotherapy for acute bronchiolitis in paediatric patients between 0 and 24 months old. *Cochrane Database Syst Rev*. 2016; 2(2): CD004873. [PubMed](#)

Warnock L, Gates A. Chest physiotherapy compared to no chest physiotherapy for cystic fibrosis. *Cochrane Database Syst Rev*. 2015; (12): CD001401. [PubMed](#)

Andrews J, Sathe NA, Krishnaswami S, McPheeters ML. Nonpharmacologic airway clearance techniques in hospitalized patients: a systematic review. *Respir Care*. 2013; 58(12): 2160-86. [PubMed](#)

Osadnik CR, McDonald CF, Jones AP, Holland AE. Airway clearance techniques for chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2012; (3): CD008328. [PubMed](#)

Non-Randomized Studies

Alternative Comparator – Oscillatory Positive Expiratory Pressure Device

Ni Y, Ding L, Yu Y, Dai R, Chen H, Shi G. Oscillatory positive expiratory pressure treatment in lower respiratory tract infection. *Exp Ther Med*. 2018; 16(4): 3241-3248. [PubMed](#)

Guidelines and Recommendations

Not Specific to Mechanical Percussion

Strickland SL, Rubin BK, Drescher GS, et al. AARC clinical practice guideline: effectiveness of nonpharmacologic airway clearance therapies in hospitalized patients. *Respir Care*. 2013; 58(12): 2187-2193. [PubMed](#)

See Hospitalized Adult and Pediatric Patients Without Cystic Fibrosis: Recommendations 1-4 on page 2189; Adult and Pediatric Patients With Neuromuscular Disease, Respiratory Muscle Weakness, or Impaired Cough: Recommendation 2 on page 2189; Postoperative Adult and Pediatric Patients: Recommendation 3 on page 2190